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D&S VOL. 35

ADC's FIRST SUPERSONIC INTERCEPTOR

# F-102 DELTA DAGGER

A DETAIL & SCALE AVIATION PUBLICATION

in detail & scale

Bert Kinzey

# DETAIL & SCALE SERIES

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# ABOUT THE AUTHOR

Bert Kinzey, author and president of Detail & Scale, Inc., was born in Richmond, Virginia in 1945. The following year his family moved to Blacksburg, Virginia where his father became a professor of architecture at Virginia Tech (VPI). Until he was about six years old, Bert was often frightened by the loud piston-driven military fighters that sometimes flew low over his home while he was outside playing. On more than one occasion he came running into the house extremely frightened by an aircraft that had just flown over.

His father took him to the VPI airport, where cadets were learning to fly on J-3 Piper Cubs, and arranged for him to go for a flight. Bert sat on his father's lap for a short trip around Blacksburg, and that forever ended his fear of airplanes. Later, Bert's father built a balsa and tissue model of the J-3 Cub, and Bert's interest in modeling began.

Bert's fear of aircraft soon gave way to a love of aviation, and he began scale modeling. Bert looked at modeling (and still does) not as a hobby in and of itself, but as a small facet of his overall interest

*The author in the rear seat of an F-5F after returning from a Red Flag mission.*

in aviation.

In 1959 his family moved to Gainesville, Florida, where his aviation interest took second place to his trumpet playing in high school. In 1964, he graduated from P.K. Yonge High School and returned to Virginia Tech specifically to fulfill his lifetime dream to be in the Virginia Tech Regimental Band—The "Highty Tighties."

Upon graduation he was commissioned a second lieutenant in the Army, and he spent almost eight years as an army officer. During this time he commanded a Hawk guided missile battery in Korea and later wrote and taught classes in airpower, the Soviet air threat, and air defense suppression at the Army's Air Defense School at Ft. Bliss, Texas.

In August 1976, he resigned from active duty in the Army, but his reputation as being knowledgeable in all aspects of military airpower led to a job offer as a civilian with the Department of the Army. He served in this position for four years as a "subject matter expert" in military airpower and was responsible for the development of the Army's new program on aircraft identification, the first in the world to feature dynamic simulation. During this time he started Detail & Scale as a part-time business to provide detailed reference material on military aircraft.

Detail & Scale became so successful that Bert resigned from his position with the Army to devote full time to his new company. Since then he has written several books as well as articles for several magazines. He is also an avid modeler and member of the International Plastic Modelers Society (IPMS). In July 1982, he was presented with a special award by IPMS/USA in recognition for his contributions to the society. He is also a member of the American Aviation Historical Society, and the Aviation and Space Writers Association.

As a youngster who feared airplanes, it is ironic that Bert should now be so involved with aviation. He is a licensed pilot, and lives with his wife, Lynda, and their two children, Jan and Chip, in Peachtree City, Georgia, near Atlanta.

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# F-102 DELTA DAGGER

## in detail & scale

Bert Kinzey

TAB TAB BOOKS Inc.
Blue Ridge Summit, PA

Airlife Publishing Ltd.
England

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Department of Defense Still Media Branch

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FIRST EDITION
FIRST PRINTING

Published in United States by

TAB BOOKS Inc.
Blue Ridge Summit, PA 17294-0214

Library of Congress Cataloging
in Publication Data:

Kinzey, Bert.
F-102 Delta Dagger / by Bert Kinzey.
p. cm. — (Detail & scale ; v. 35)
ISBN 0-8306-3046-5 (pbk.)
1. Delta Dagger (Jet fighter plane) I. Title.
UG1242.F5K5363 1990
623.7'464—dc20 89-20199
CIP

First published in Great Britain in 1989
by Airlife Publishing Ltd.
7 St. John's Hill, Shrewsbury, SY1 1JE

British Library Cataloging in
Publication Data
Kinzey, Bert, *1945-*
F-102 Delta Dagger.1. Fighter aeroplanes
I. Title II. Leader, Ray III. Series
623.74'64

ISBN 1-85310-618-6 (pbk)

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Blue Ridge Summit, PA 17294-0214

*Front cover: This beautiful photograph shows F-102A, 55-3432, of the 178th FIS, 119th FIG, North Dakota Air National Guard flying past snow covered mountains in 1974. (USAF via Sullivan)*

*Rear cover: Cockpit colors for all versions of the Deuce were similar to these shown in this QF-102 drone.*

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# INTRODUCTION

*The cross section of the F-102A is revealed in this front view. This is an early aircraft which has the Case X wing as indicated by the upturned wing tips. The shape of the engine air inlets is also evident. (USAF)*

Designed from the start not merely as an aircraft, but as a weapons system of which the airframe was only the carrier, the F-102 was born when supersonic flight was still filled with unknowns. Aircraft designs were constantly changing as the engineers tried to determine the best shape for the fuselage, wings, and control surfaces of an airplane that was expected to fly faster than the speed of sound. Many of the tried and true planforms, airfoils, and structural designs had to be discarded and replaced with those that were still in the experimental stage. The development of the F-102 exemplified many of the problems and solutions associated with the early attempts to build a production supersonic aircraft.

There has been very little written about this historically important aircraft. In this new volume, Detail & Scale takes a close-up look at the F-102 from the original prototype design right up to the use of the aircraft as a high speed drone after its retirement from active Air Force and Air National Guard service. A developmental history provides a summary of the evolution of the F-102 design, its problems, and the solutions. Through the use of carefully selected photographs, the aerodynamic and engineering changes made to the prototypes are illustrated. These include comparisons of the original fuselage to the longer and wasp-waisted design, the older short tail to the taller version, and the Case X and Case XX wings. Operational use of the F-102 in the Air Defense Command, USAFE, PACAF, Alaskan Air Command, Vietnam, and by foreign nations is also discussed. A pilot's report is included that was written by Ken Lundquist, a former F-102 pilot with some interesting information and "war stories" about the Delta Dagger. Ken's report makes for enlightening reading about an aircraft that is no longer in the inventory. Separate sections on the F-102A and TF-102 provide statistical and performance data on each of the two versions. Five-view drawings are included in 1/72nd scale, and were drawn especially for this publication by Dana Bell.

Several contributors have provided valuable assistance, information, and photographs for this book, and they are listed on page 2. A special acknowledgment and word of thanks are due to Bill Paul of the Museum of Aviation at Robins AFB, Georgia. Bill worked for several hours on a hot and humid day in August 1989 to remove the radome from the F-102 that is on display at the Museum of Aviation. The radome had not been removed from the aircraft that had been on display, first at Harlengen, Texas, then in Georgia, since its retirement in 1971. Because of his efforts, we are able to provide the color photographs of the radar found on page 37. We had checked with General Dynamics, Hughes, the National Archives, and the Department of Defense Still Media Branch trying to find photographs of the radar, and they did not seem to exist anywhere. Therefore, Bill's efforts were very important. Several other detailed photographs that appear in this book were also taken of the F-102A at the Museum of Aviation at Robins AFB. This is an outstanding museum, and we encourage everyone who loves aviation to visit and support this fine showplace of military aircraft.

We also want to acknowledge the help of Geoff Hays and his staff at the Air Force Museum at Dayton, Ohio. The photographs of the fire control system and other details were made available through his efforts.

As usual, the major focus of this publication is a look at the many details of the F-102. Photographs are included to show the radar, fire control system, cockpit, landing gear, engine, weapons bay, and other details. As is the case with most publications in the Detail & Scale Series, the majority of these detailed photographs were taken specifically for this publication. Our customary modeler's section covers the kits that have been issued of the Delta Dagger beginning with the earliest models of the prototypes and ending with a preview of the new Monogram kit that is forthcoming. A listing of aftermarket decals provides the modeler with information about the available decals for the F-102 kits. We hope that these features combine to make this addition to the Detail & Scale Series a valuable reference for aviation historians, enthusiasts, and modelers alike.

# DEVELOPMENTAL HISTORY

*YF-102, 53-1782, illustrates the short stubby fuselage and framed canopy that were features of the original design. The YF-102 did not exceed Mach 1 without the help from gravity in a dive. Many design changes would be required before the aircraft could begin to meet performance expectations.* *(USAF via Isham)*

**The Background**

If there was one lesson to be learned from the First World War, it was that whichever side ruled the air won the war. The importance of air power was recognized by far too few military leaders in the United States as America, just happy the fighting was over, stuck its head in the sand after the war ended as usual. The lesson was better understood and heeded by other powers from Europe and Japan, but, in the United States, funding for the development and production of military aircraft was reduced to a trickle. A few visionary military leaders like Billy Mitchell realized the importance of air power and fought to attain funds to develop it in the United States. It was Mitchell's goal to have an air force that was a separate branch of the service on the same level as the Army and Navy. The primary reason for this was to enable this air force to receive funding directly from Congress like the other services rather than being limited to whatever the Army wanted to allocate to it. While Mitchell did make some strides in this direction, his less than diplomatic way of doing things first got him reduced in rank and relieved from command, then finally he was court martialed. But future events were to prove Mitchell correct, and things were different after World War II.

Although the United States destroyed its war-making abilities in wholesale fashion after the end of World War II, it did realize the need for a strong defense. A number of factors caused serious thinking about future possibilities of war. Most important was the dawn of the nuclear age, and military planners knew that the United States did not need just a way to deliver nuclear weapons, but a way to defend against them as well. This was not a simple matter, since the "bomb" had changed almost everything when it came to both strategic and tactical warfare.

**Changing Technology and Changing Concepts**

It was during this time period that Mitchell's dream of a separate air force became a reality, and the U.S. Air Force was born as a separate and equal branch of the service. This came when the most dramatic changes in history were happening in military aviation. In addition to the nuclear weapons that were being developed, the jet age

was no longer dawning but was in full swing. The jet engine was powering aircraft to greater and greater speeds, and, as the sound barrier was broken, the aeronautical engineers of the day were faced with new and unknown problems related to aircraft design. All of this meant that the entire concept of military aviation was changing, and the newly formed Air Force had to keep up with this.

One concept that changed when the first atomic bomb was exploded was that the traditional mass bomber raid that had become a perfected tactic during World War II was obsolete. At times over one thousand bombers attacked a given target in Germany, and hundreds of B-29s dropped thousands of bombs in a single raid over Japan. But carrying a single nuclear bomb, one aircraft could do the same thing that hundreds of bombers had done before. In the large scale bombing raids against Germany, the enemy's anti-aircraft guns and fighters could significantly lessen the effects of the bombing raid if they shot down a large number of bombers, but fortunately, their ability to do so was reduced more and more as the war continued. But the Air Force realized that if an attack was made against the United States by bombers with nuclear weapons, all of them would have to be stopped. Even if a single bomber got through to its target it could do enormous damage that might result in the complete destruction of a critical military or industrial complex, and certainly there would be great loss of life. Therefore the Air Force wanted to build a defense that would defend against every bomber that could be launched against the North American Continent. Two radar lines, the Pine Tree Line in 1955 and the Distant Early Warning (DEW) Line in 1958, were built across the polar routes that the enemy bombers were likely to fly. It was their job to find the bombers. It was the interceptor's job to shoot them down. Because of the fact that the Soviet Union became a nuclear power shortly after the United States, and considering that they were building a large bomber force that included the intercontinental Mya-4 Bison and the Tu-95 Bear, the Air Force was looking for an interceptor that could shoot these bombers down day or night and in all kinds of weather. It was this requirement that would lead to the F-102 Delta Dagger.

### The Fighter-Interceptor

This brings up another change in thinking and concepts that occurred during the years immediately after World War II. Up until that time, the fighters in the U.S. Army Air Corps had been designated by the letter P for pursuit. After the war, and as the first jets were becoming operational, this was changed to F for fighter. More importantly, the Air Force was looking at fighters in terms of more specialized missions. The F-86 Sabre was a pure air superiority fighter, but the F-84 Thunderjet and F-105 Thunderchief that followed later were fighter-bombers, designed more to attack targets on the ground than hassle with other aircraft in the air. To defend against the enemy's bombers, the Air Force wanted a fighter-interceptor with a design that was optimized for the single mission of shooting down bombers. Its fire control system and weapons would be designed to attack only an airborne target, and in short, the "pure" interceptor would have no capability to attack a ground target short of crashing into it. The interceptor was to be fast, have a radar that would permit it to carry out its attack in any weather and at night without the pilot ever seeing his target, and it was to be armed with weapons that would insure the complete destruction of the bomber and its nuclear weapon. Therefore rockets and the guided missiles, both with a longer range and more destructive power than a cannon, were to comprise the armament of this new interceptor.

### Early Interceptors

Although any fighter could take off and engage a bomber, it could not effectively do so in any weather or at night, and the cannon armament was not considered to be sufficient. Two of the first interceptors to enter the inventory were based on fighter designs, and these were the F-86D with its "drawer" of 2.75-inch rockets, and the F-94 Starfire, which was based on the F-80/T-33 design. The F-94A and -B were armed with cannon, but the F-94C was rocket armed. The F-86K was a cannon armed interceptor, but the change to rocket armament was clearly established.

The other early interceptor was the F-89 Scorpion, which was designed as an interceptor from the start. Early versions were armed with cannons, but 104 rockets made the F-89D the most heavily armed fighter of its day. Later versions carried the first Falcon guided missiles and the Genie rocket with its nuclear warhead. All of this pointed the direction in which the Air Force wanted to go, but it was only a start. None of these aircraft were supersonic, their fire control system left a lot to be desired, and interceptors that could carry a mix of IR and radar-guided missiles were needed. The Air Force believed that it was desirable for the interceptor to carry its missiles internally where they would be protected and would not cause drag to slow the aircraft down or effect its maneuverability. This feature would be realized in the F-102 and the F-106 that followed.

### Wing Designs for Supersonic Flight

As soon as the sound barrier was broken, it became standard for the Air Force to specify that all future fighters were to be supersonic in level flight. This marked the beginning of the Century Series of fighters. It is interesting to see how the different manufacturers of these aircraft solved the problems of supersonic flight in their designs. Perhaps the best comparison was in the wing designs. It was clear that flight in excess of Mach 1 was not going to be accomplished in a production aircraft with a conventional airfoil and a straight wing. The most

*The world's first aircraft to fly with a delta wing was the XF-92, also built by Convair. The YF-102 was based on this design. Convair went on to build the most delta-winged designs in the United States. In addition to the XF-92 and F-102, these designs also included the F-106, the Sea Dart, the B-58 Hustler, and others. (Convair via Jones)*

obvious solution, and the one tried first with success, was to sweep the wing back. The swept wing generally offered less drag, it looked more streamlined and faster, but there was more to it than that. For high speed flight, it was important that the ratio of the wing thickness to its chord be as low as possible. The chord had to be as long as possible and the wing had to be made very thin. North American and McDonnell used swept wings on the F-100 and F-101 respectively, while Lockheed's F-104 Starfighter epitomized the use of a thin wing on a supersonic aircraft. In fact, it proved that you could still use a straight wing if you made it thin enough! With its F-105 Thunderchief, Republic used a relatively thin swept wing with unique reversed intakes to design an aircraft that was supersonic even at very low altitudes.

The two other Century Series fighters, the F-102 and F-106, were built by Convair, formerly Consolidated-Vultee, and now part of General Dynamics. Convair's approach was to use the delta wing on these and other high speed aircraft it was designing. The delta wing, so named because it resembled the Greek letter delta, offered a long chord, particularly at the root. If made thin enough, Convair figured it was just the wing to provide excellent characteristics for high speed flight. Further, with its good wing loading, it would be very maneuverable.

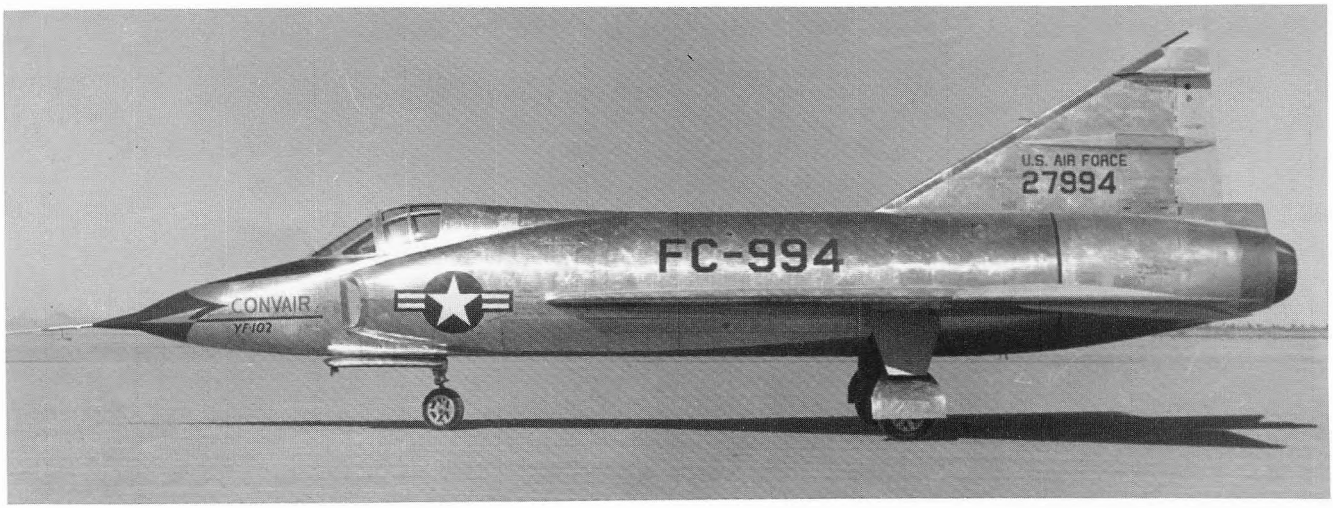
Alexander M. Lippisch of Germany, who had designed the Me-163 Komet rocket-propelled interceptor in World War II, had suggested the tailless delta design, and theorized that it would have good stall characteristics and little tendency to spin or lose control at high angles of attack. Being a large wing, it would provide room for a generous fuel capacity even if it were relatively thin, and it would have less of a tendency for aileron reversal. But other designers were not so sure. They said that a tailless aircraft would flip over on its back and be uncontrollable.

**Proving the Delta**

Convair believed in the delta wing, and designed the first aircraft to fly with one in the form of the XF-92, which was Convair's Model 7000. In September 1945, when the contract for the XF-92 was issued and even before the sound barrier had been broken, their hopes were to design an aircraft that would fly at Mach 1.25. It first flew on June 9, 1948, using an Allison J33 engine with no afterburner. Later an afterburner was added and the designation was changed to XF-92A (Convair Model 7002), but even then the aircraft failed to go supersonic in level flight. However, it did provide a platform for transonic research, and it proved the feasibility of the delta wing. The groundwork for the forthcoming F-102 and F-106 had been laid.

**The Supersonic Interceptor**

It was January 13, 1949, when the newly formed U.S. Air Force issued an Advanced Development Objective (ADO) for a specially designed interceptor to defend against the ever increasing Soviet bomber threat. It was called the 1954 interceptor, making reference to the year it was expected to become operational. The Air Force specified that the aircraft must have speed and altitude capabilities in excess of any Soviet jet bomber that it would defend against. It was not merely a new aircraft that the Air Force was looking for. Instead, the concept formulation called for a complete weapon system to be developed. This meant that the airframe, fire control system, missiles, and all other components were to be devel-




*This is the first prototype YF-102, 52-7994, and similarities to the XF-92 design are apparent. One major difference is that the single air inlet in the nose of the XF-92 was replaced with two inlets mounted on the sides of the fuselage. This was necessary to make room for the radar antenna and fire control system that would be located in the nose of the F-102. The aircraft pictured here was destroyed in a crash on its seventh flight in November 1953.*

*(USAF via Isham)*

oped together in an integrated design where each part was compatible with all of the others. This was the first time the "weapon system concept" had been tried.

Of course these components would be built by different manufacturers, so the Air Force had to issue contracts for each and coordinate the entire effort in order to end up with the desired weapon system. A Request for Proposals (RFP) for the airframe was issued on June 18, 1950, and designated Project MX-1554. This RFP specified an aircraft that would fly at supersonic speeds and have a ceiling of 50,000 feet. The Air Force wanted the aircraft fast, so the year 1954 was indicated as the date for which the system would become operational. But in retrospect, what the Air Force was asking for was unrealistic. All it wanted was an interceptor of radical design that could fly at supersonic speeds, designed around a fire control system that did not even exist. In this design, the manufacturer had to include a weapons bay to carry and to fire missiles that also did not exist at the time! Further, the study of supersonic flight was in its infancy, and there were still many unknowns that had not even been discovered, much less solved.

In the meantime, Hughes was awarded a contract for Project MX-1179 which was the fire control component around which the airframe would be built. Hughes had already worked with the collision course technique where the interceptor flew a head-on pass under radar control and fired a rocket armament at the target. This technique got the interceptor to the targets more quickly than other tactics, and assured the highest probability of a kill. It had already been tried with the earlier systems in the F-86D, the F-89, and the F-94. With the F-102 the idea was that the interceptor would be under ground control at all times, and the fire control system would fly the aircraft to the proper point of intercept and fire the weapons automatically. The pilot merely rode along as an observer. In practice, it was not quite this simple.

A little over six months later, in January 1951, six contractors submitted a total of nine proposals for Project MX-1554. Republic submitted three, North American had two, and one each came from Lockheed, Chance-Vought, Douglas, and Convair. This field was reduced to three the following month when one of the Republic proposals and the ones from Lockheed and Convair were ordered to proceed to the mock-up stage. The Lockheed entry soon fell by the wayside, and the Convair XF-102 and Republic's XF-103 remained. On September 11, 1951, a letter contract declared the XF-102 the winner.

Convair's design was in many respects a scaled-up XF-92, and it featured the sixty-degree delta wing that had been proven with that earlier test aircraft. Plans called for it to be powered by the Wright J67 engine, and Convair expected the aircraft to reach Mach 1.93 at 62,000 feet. But the Wright engine was not available, and until it was the Westinghouse J40 would be used instead. With this engine, the expected performance was still a healthy Mach 1.88 at 56,500 feet of altitude.

The urgency with which the Air Force wanted this interceptor and other aircraft was reflected in what became known as the Cook-Craigie Plan. This plan countered the "fly before you buy" concept, and called for tooling and limited production before flight testing of the prototypes was completed. The plan was formulated by General Orval R. Cook, who was Deputy Chief of Staff for Materiel, and General Laurence C. Craigie, DCS for Development. Under this concept, it was hoped that little would be needed in the way of changes based on flight testing, and what changes were required would be retrofitted to those aircraft that had already been produced. As flight testing neared its completion the production would be speeded up. It was a gamble, but it meant that the aircraft would be in production and operational sooner.

Long before the first piece of metal was cut for the first prototype, the Air Force began to realize that the year 1954 was unrealistic as a goal for Initial Operational Capability (IOC) of this interceptor. In December 1951, it issued a new letter contract to Convair calling for an "interim" version of the interceptor. In effect, the Air Force was willing to trade off some capabilities in order to get an interceptor operational earlier. It called for the interim interceptor to be in production by mid-1953. Although there were no specific guidelines provided as to what performance capabilities this interim aircraft was to meet, the Air Force stated that it had to be "sufficiently advanced over the F-86D to justify its production." The engine, fire control system, and weapons had to be as advanced as possible and still meet the 1953 IOC date. In effect, what the Air Force was doing was making the date more important than specific performance criteria. While this interim aircraft was brought to production status as quickly as possible, work was to proceed on the ultimate interceptor that would meet the original specifications of the 1954 interceptor.

The interim interceptor was designated F-102A, and originally called the Machete. The name was soon changed to Delta Dagger, but the aircraft was usually referred to as the Deuce. The ultimate interceptor was originally assigned the designation F-102B. However, as more and more changes were made, it was redesignated F-106A in 1956. When the decision was made to build first an interim interceptor as fast as possible, then produce an ultimate interceptor when it was ready, the Air Force thought that only a relative few of the F-102As would be built to fill the gap between its existing interceptors and the F-102B. But as time went on, it became clear that more and more of the F-102As would be needed, meaning that less and less of the ultimate interceptors would be built. As it finally turned out, over three times as many interim F-102As were built as compared to the ultimate F-106s.

### Early Problems

Work progressed on the F-102's design, and a mock-up inspection was held on November 18, 1952. But over at Hughes, things were not going very well. It became clear that the MX-1179 system was not going to be ready until 1955 at the earliest, so it was decided to fit an interim fire control system into the interim interceptor. The E-9 was chosen, and, with improvements, it became the MG-3 which was initially installed in the aircraft. From the MG-3, the MG-10 was developed. But by now the "weapon system concept" had essentially collapsed.

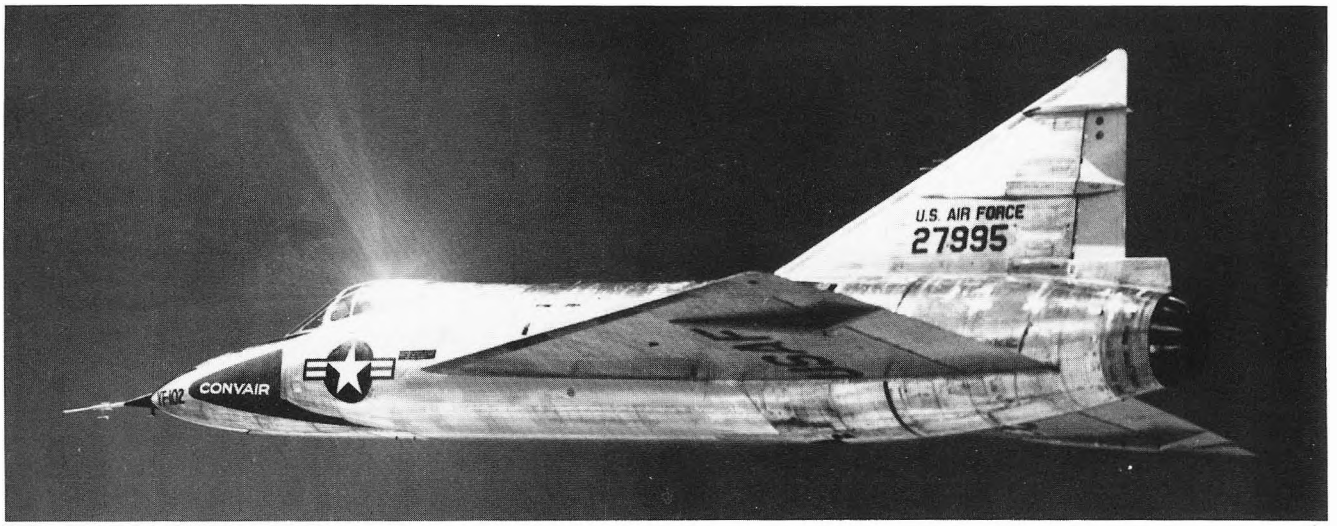
Changes requested for the F-102 and its armament meant more weight, and this posed a problem when it became apparent that the J40 engine was not going to deliver the expected performance. Pratt & Whitney's J57 was expected to be ready in early 1953, and although it provided more thrust than the J40, it was also heavier. Wind tunnel tests had demonstrated that the aircraft was not going to meet the speed, range, and altitude expectations, although they did indicate that the aircraft would be supersonic. However, there was no supersonic wind tunnel capable of testing the full scale design at the time. Scale models in smaller wind tunnels failed to adequately compensate for the scale effect on the data.

On June 12, 1953, the date originally set for the interim interceptor to become operational, a contract was awarded to Convair that called for production of the F-102A to begin under the Cook-Craigie plan the following April. But as yet, the first prototype had not left the ground.

On October 24, 1953, several months after the date that the Air Force had insisted the interim interceptor be in service, the first YF-102 made its first flight with Convair's chief test pilot, Richard L. Johnson, at the controls. The J57-P-11 engine had been fitted, but even with its increased thrust, the performance was disappointing to say the least. It was only marginally better than the F-86D. Simply stated, the YF-102's transonic drag was too much for the available thrust of the engine. There were also severe buffet and yaw problems at high speeds, and supersonic speed in level flight was unattainable. The wind tunnel data had been wrong. As if this was not bad enough, the aircraft was lost in a crash on its seventh flight on November 2. On January 11, 1954, the second YF-102 continued the flight testing, and a number of fixes were tried. These included a new wing with a conical camber and a change to the elevon where it joined the fuselage. Both of these remedies were made to the wing, but in December 1953, Richard T. Whitcomb of NACA presented his area rule principle that showed that the problem was the fuselage design. The area rule principle stated that the aircraft should have a shape where the total cross-sectional area from the nose to the tail should be a smooth curve with no bumps or indentations. Of course the added cross section of the wing was a big "bump." To compensate for this, the fuselage should be pinched in so that the cross section or area remained as near constant as possible. Another way of putting it was that drag at transonic speeds depends almost completely on the total cross sectional area of the aircraft along the direction of flight. This area rule principle was also called the "NACA ideal body theory," but was more commonly referred to as the Marilyn Monroe design, wasp waisting, or the Coke bottle shape. Regardless of what it was called, it was to change the shape of aircraft forever.

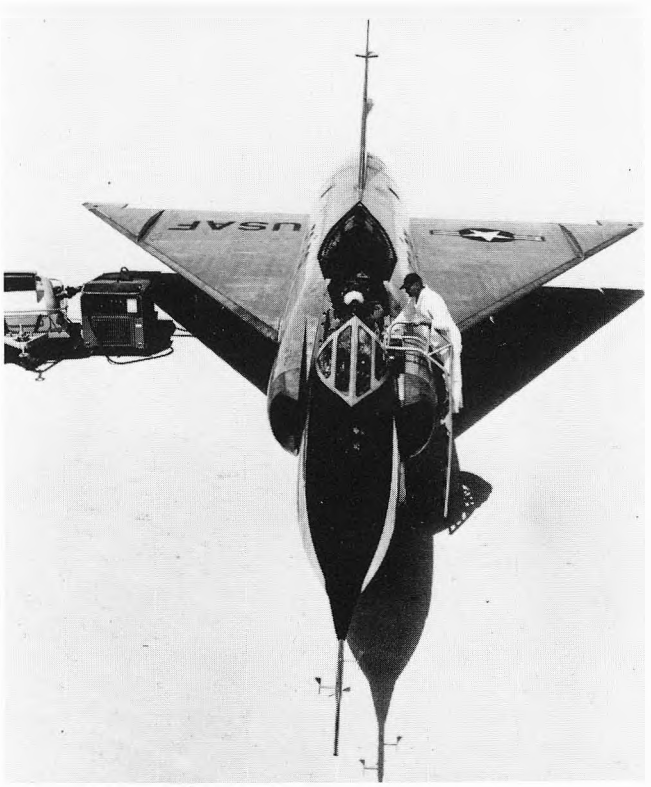
### Changes and More Changes

It all sounded good on paper, but the problem was that there was not much room inside the fuselage to allow it to be reduced in cross section very much. Instead, aerodynamic bulges were added to the tail section of the fuselage of the second YF-102, and its nose was lengthened. The performance improved, but it still could not reach supersonic speeds in level flight. The fuselage was lengthened again to 68 feet, 3 inches to increase its fineness




*This is the second YF-102, 52-7995, which carried on the flight test program after the first prototype was lost in a crash. The short stubby lines are illustrated, and vary considerably from those of the final F-102 design. (USAF)*

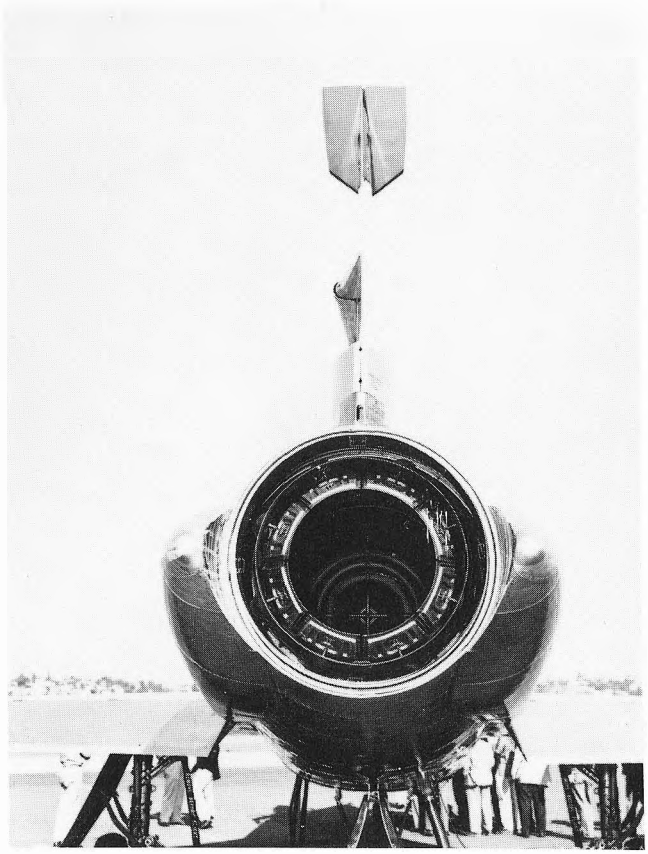
ratio (the ratio of its length to diameter). The nose was made more streamlined and was angled downward slightly, the canopy was changed from the previous framed affair to a more aerodynamic V shape, and the cockpit was moved forward on the nose. A pair of boundary layer fences was added to the wings, the span was increased thirteen inches, and the wing was made thinner. Actuators for the elevons were placed in external fairings. Additionally, the more powerful J57-P-41 engine was fitted. These changes, accomplished in 117 hectic working days at Convair, resulted in the YF-102A which flew for the first time on December 20, 1954. The next day it easily flew through the sound barrier to Mach 1.2 in level flight, then exceeded Mach 1 in a climb. Everyone




*More details of the first YF-102 are shown in this view which reveals the framing on the original windscreen, the single boundary layer fence on each wing, and the intakes which are angled back. The fact that the fuselage does not conform to the area rule principle is evident. (USAF)*

*The planform for the sixty-degree delta wing is visible from beneath this YF-102. Note the hinges for the elevons under each wing. The wing used on the prototypes was actually a pre-Case X design. Again note the lack of any use of the area rule principle to the fuselage of the YF-102. This was because the principle had not been known at the time the YF-102 was designed. (USAF)*

*This aircraft, 53-1787, was the first YF-102A, and it shows many of the major improvements over the original YF-102 design. Among these are the redesigned intakes, the longer and more streamlined nose, the V canopy and windscreen which replaced the earlier framed design, and the aerodynamic bulges on the tail section of the fuselage. There is a second smaller wing fence inboard of the original larger one, and the wing itself is now basically what would become known as the Case X design. (USAF via Isham)*

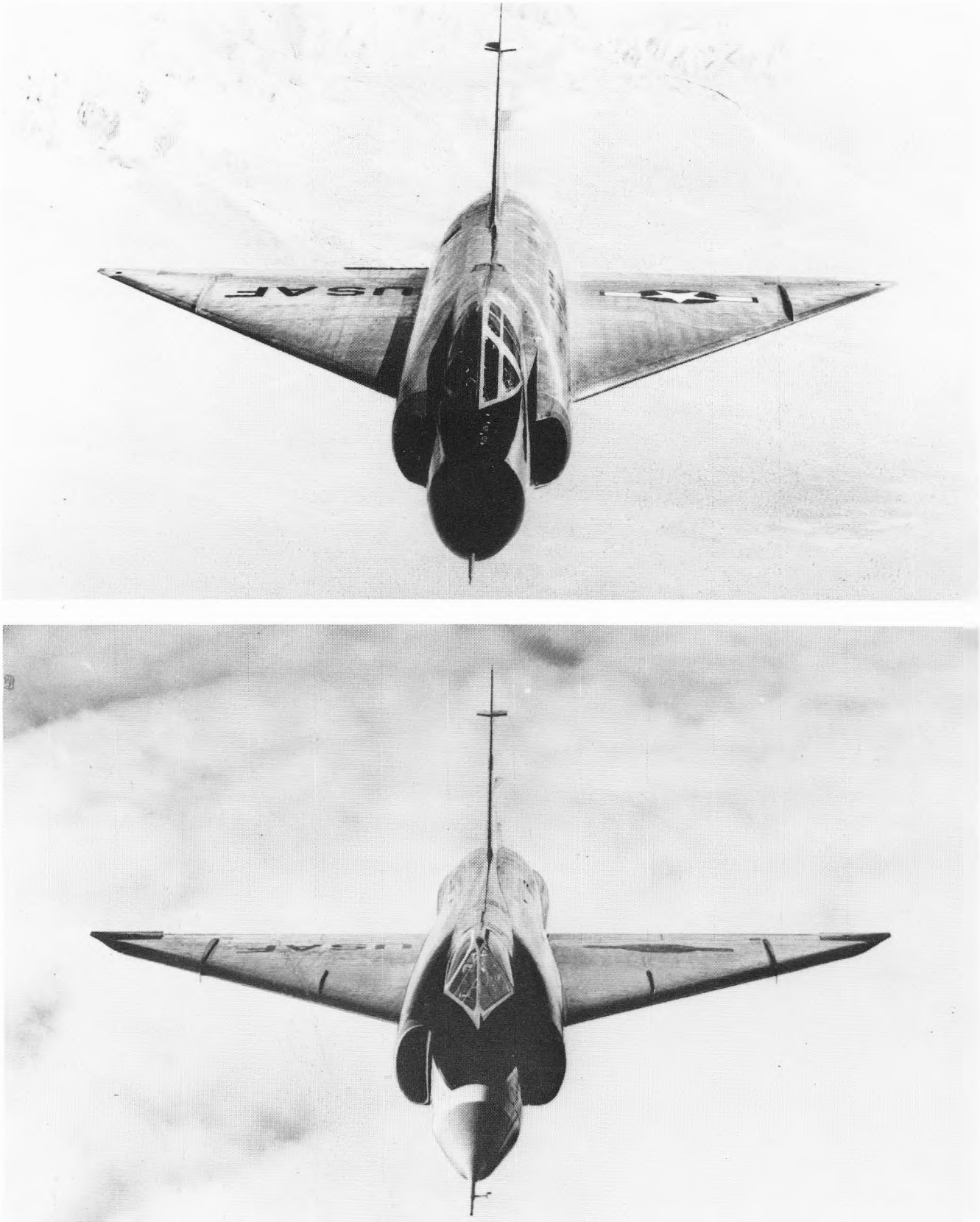


*The aerodynamic bulges or fairings that were added to either side of the aft fuselage section are visible in this photograph. These were necessary because the fuselage itself could not be "pinched in" very much in the middle, so the alternative was to make the ends wider. Also shown here are the afterburner nozzle for the engine, the small speed brake in the closed position, and the rudder hinge on the left side of the vertical tail. (USAF)*

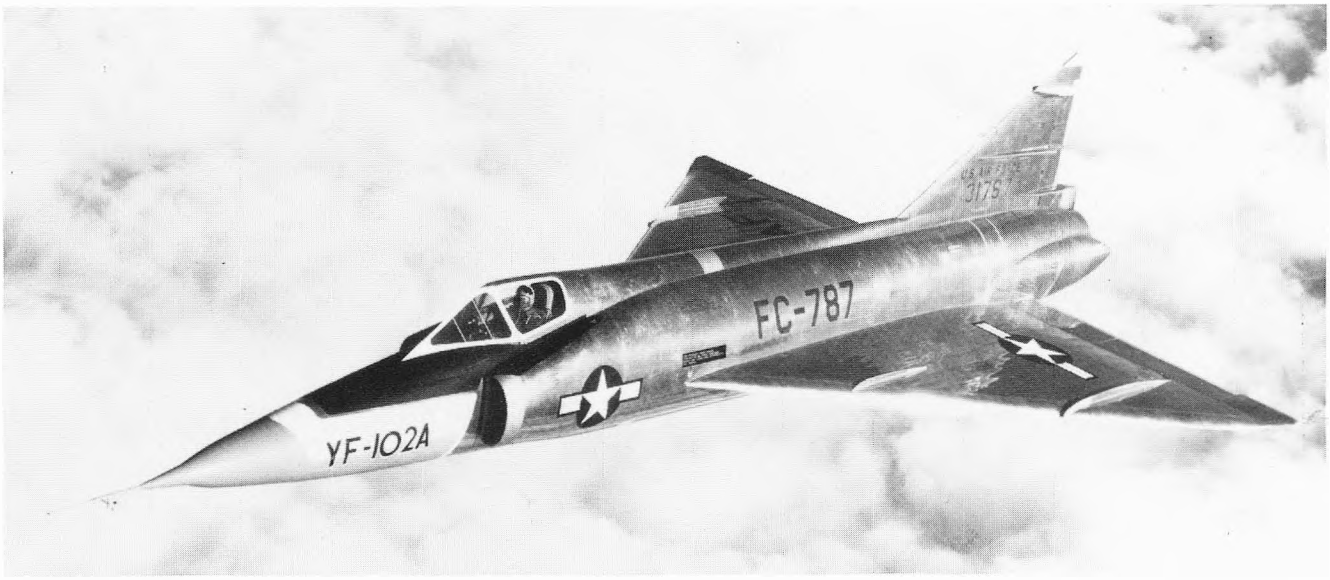
breathed a sigh of relief, but by this time, eight other aircraft with the straight fuselage had been produced. These were assigned to the test program and two went to Hughes for development of the fire control system.

Throughout the test program many more changes were made to the design. In addition to those already mentioned, the wing and tail surfaces were relocated, and later the problem of roll coupling caused the vertical tail to be enlarged. By then sixty-six aircraft had been produced with the smaller tail, and had to be refitted. Making this and the many other changes to the production aircraft after they were built and as they came down the assembly line left the Cook-Craigie plan for early tooling and production in shambles. Two-thirds of the tools had to be discarded and new ones made.

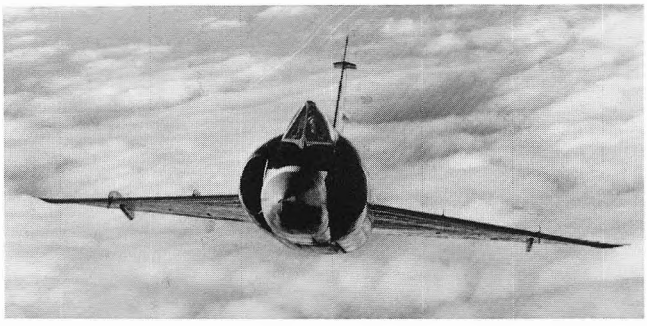
With the problems seemingly solved to an acceptable extent, the YF-102A, in what was called the "Hot Rod" configuration, became the standard for aircraft on the production lines. On June 24, 1955, the first flight was made by a production aircraft built to all of these specifications except that at this point the larger vertical tail had not been added. It became the first F-102A accepted by the Air Force four days later, and it was in April 1956 that the F-102A Delta Dagger entered operational service with the 327th FIS at George AFB, California. As it entered service, it was the most advanced defensive aircraft in the world. The following month the larger vertical tail was added to the production line and retrofitted to most aircraft already produced. Later changes included redesigned intakes with ramps, and the speed brakes, called boards, were enlarged. Numerous smaller changes would be made throughout the life of the Deuce, and improvements were added. Many of these were external, but others were internal and less noticeable. Most important of the internal changes was that the interim MG-3 fire



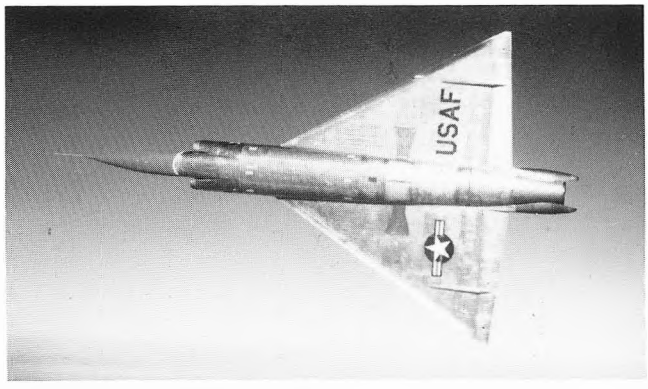
*These two photographs provide a good comparison between the YF-102 (top) and the YF-102A. The area rule principle as it was applied to the longer fuselage of the YF-102A is quite apparent when compared to the original design. Other changes that are illustrated include the different intakes, the more streamlined nose section, the smaller canopy, and the second smaller pair of wing fences. Also note the upturned wing tips of the Case X wing in the lower photo as compared to the straight tips in the upper photo.* *(Both USAF)*



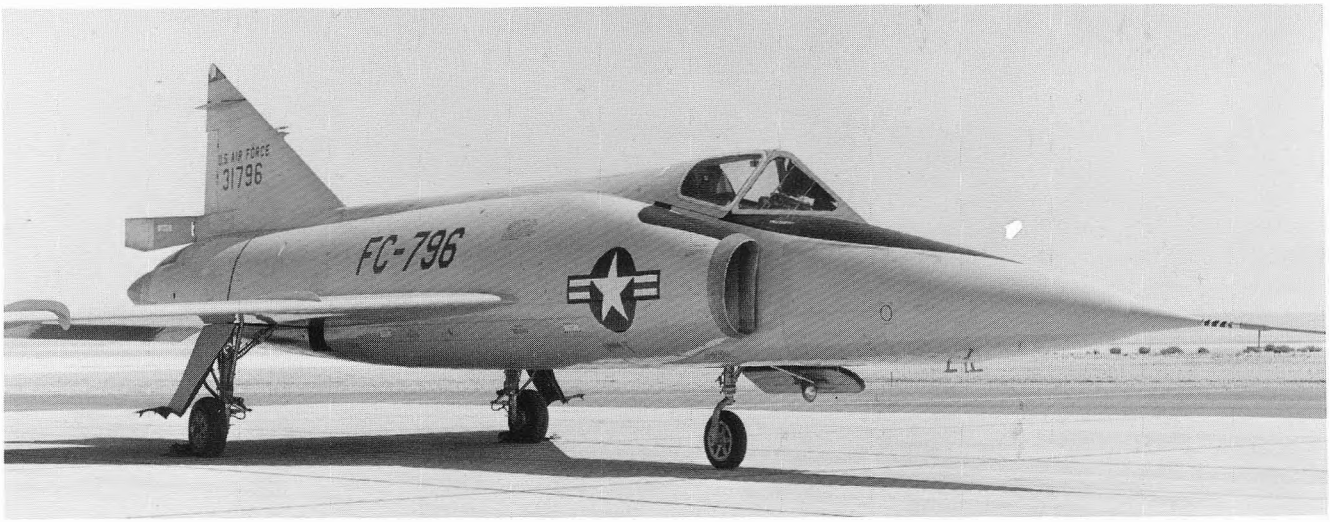

*Most of the design features of the F-102 were determined by the time this photograph was taken of the first YF-102A. Still to come were ramps ahead of the intakes, a larger speed brake, and a taller vertical tail. But hundreds of smaller changes and improvements would be made throughout the entire operational life of the Delta Dagger.*
*(USAF via Isham)*



*The upturned wing tips, boundary layer fences, and hinges on the broad delta wings are visible in this dramatic head-on, in-flight view of one of the YF-102As.*
*(USAF via Isham)*




*Underside details of the YF-102A are illustrated here.*
*(USAF)*

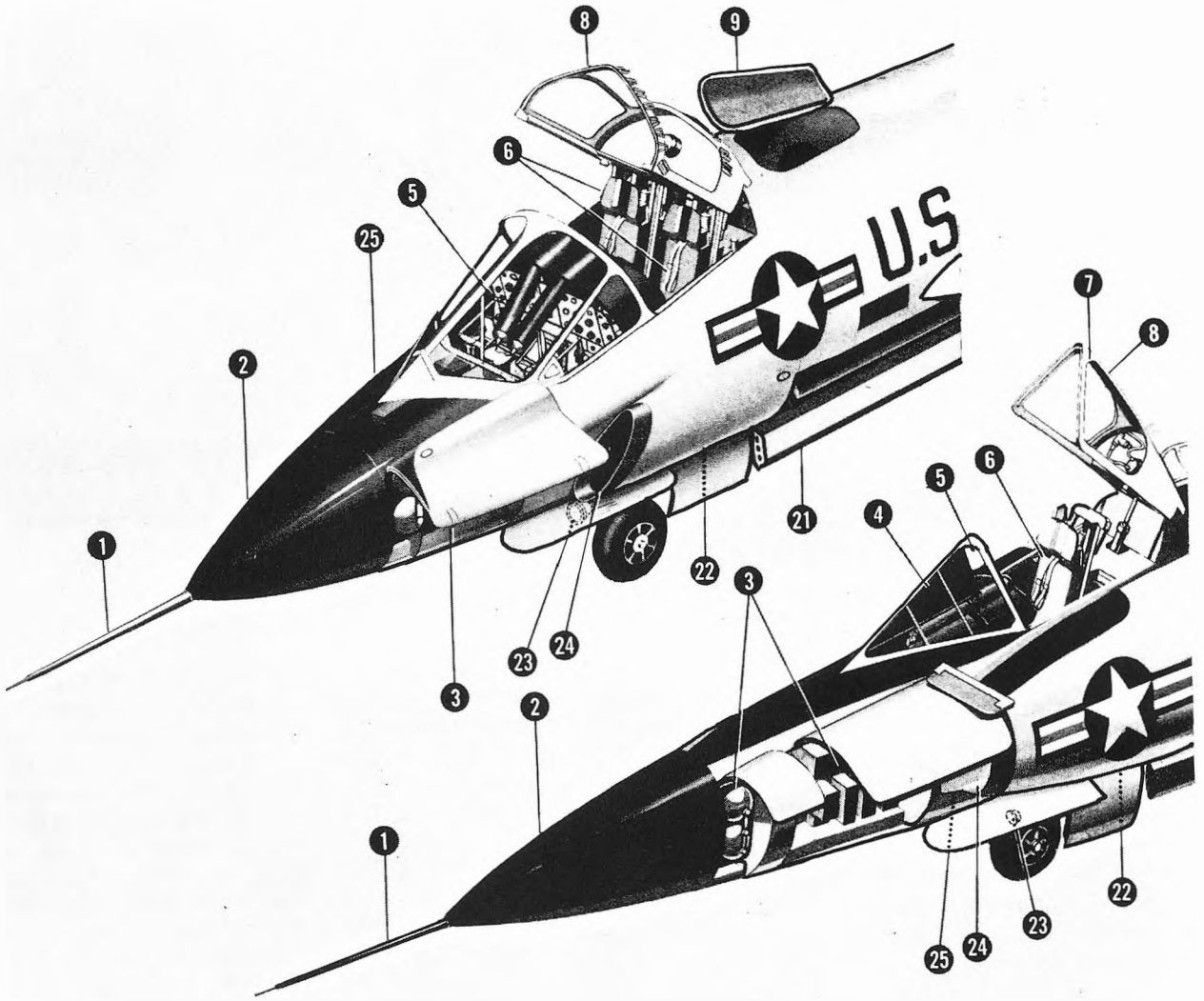



*Since limited production of the F-102A began while flight testing of the YF-102As was still in progress, the first production aircraft were nearly identical to the test aircraft. This is the sixth production example in overall ADC gray paint as photographed on September 17, 1956. As was the case with the YF-102As, it has the small speed brakes, the short vertical tail, and the lack of ramps on the intakes.* *(USAF)*

*Although 54-1394 was part of the second production block of F-102s, it still has the short tail, the small speed brake, and no intake ramps. Early standard markings for the Deuce are illustrated here. These include the national insignias for the fuselage being positioned on the nose section, a large "bent" **U. S. AIR FORCE** running from well forward on the intake to a point about half way back on the fuselage, and the buzz number being located aft of that. The **F** stood for fighter, the **C** was the designator for the F-102A, and the **394** were the last three digits of the serial number. (USAF)*

*The next major change to the design of the Deuce was the addition of the taller vertical tail as shown here. However, the aircraft still has the smaller speed brake and lacks the intake ramps. Smaller details that are noteworthy include the locations of the position lights. These appear as small dots on the skin of the aircraft. One is located above the **R** in the word **FORCE.** This one was later moved forward to a position approximately above the **I** in **AIR.** One is on each wing tip and a pair are located just aft of the trailing edge of the wing on the aerodynamic fairing. (Convair)*

*All major design changes to the F-102 are exemplified on 57-0830, as photographed at Homestead AFB, Florida, on October 25, 1962, during the Cuban Missile Crisis. Note the larger speed brake and the intake ramps. Less visible is the Case XX wing. The tail hook has been added, but as yet the IR sensor has not been mounted in front of the windscreen. (USAF)*

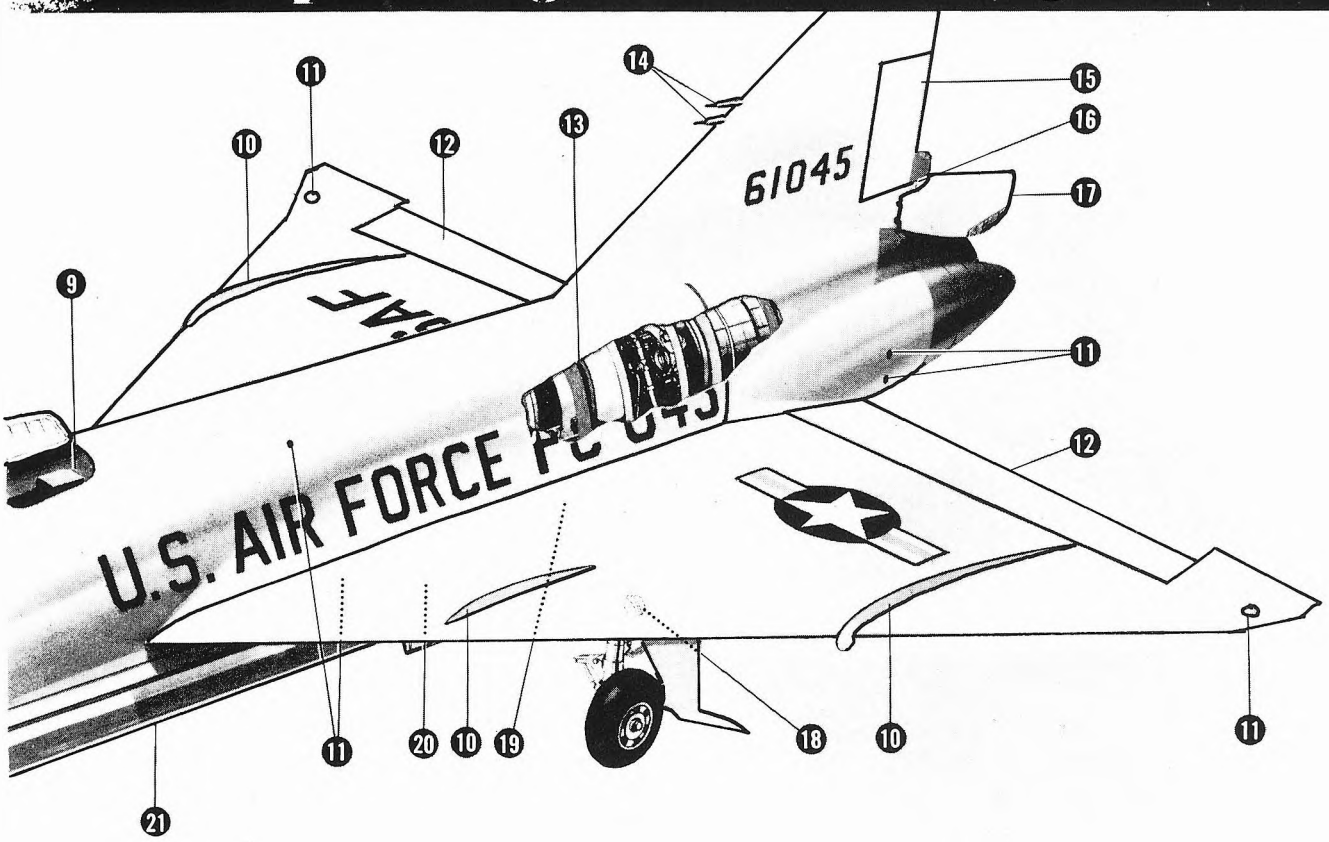



control system was replaced with the MG-10 in 1958.

The MG-10 weighed 1,425 pounds and took up 24.6 cubic feet of space. Most of this was in the nose section, but some was located behind the cockpit. Being controlled by the SAGE system in North America, or NAGE in Europe, the F-102A received digital signals which the MG-10 translated to analog form, and then it displayed the information on the radar scope. Once he could see the target on his scope, the pilot could continue the intercept with no subsequent direction from the ground. After the radar locked on to the target, the MG-10 flew the F-102A on the proper attack heading then fired the missiles at the appropriate time. Additionally, the MG-10 could attack with automatic infrared or radar search, and the armament could be fired from any heading relative to the target. It was also used during instrument landing approaches. In theory the F-102A could almost function as an unmanned interceptor with the pilot just along for the ride. But Deuce pilots will tell you that this was not really the case. In 1965, a data link system was added that allowed the pilot to receive information electronically rather than by voice, thus further improving the system.

One of the more interesting changes that was made well into the production of the F-102 was the wing change beginning with 56-1317. The wing used up to that time was known as the Case X (Case ten) wing, but then the change was made to the Case XX (Case twenty) wing. The new wing was noticeably cambered with downturned tips. The elevons were also changed at the outer edge where they angled outward rather than being parallel to the aircraft's centerline. Since this wing change was made so late in the production run, earlier aircraft were not retrofitted. The first test aircraft with a Case XX wing made its first flight in May 1957, and it was added to the production line in October of that year. The ceiling increased to 55,000 feet, maneuverability improved, and slow speed stability was enhanced. Drop tanks were added in 1958, and an IR seeker was located on the nose of many aircraft beginning in 1963 under a program known as Project Big Eight. A barrier probe was added in 1957 and 1958, and a tail hook was installed in 1960. These and other changes are illustrated on the pages of

# airplane general arrangement




1. Pitot Boom
2. Radome
3. Forward Electronics Compartments
4. Vision Splitter
5. Windshield
6. Ejection Seat
7. Accelerometer (Some Airplanes)
8. Canopy
9. Upper Electronics Compartment
10. Wing Fence
11. Position Lights
12. Elevon
13. Engine
14. Ram Air (q) Intakes
15. Rudder
16. Drag Chute Compartment
17. Speed Brakes
18. Landing Light
19. External Power Receptacle
20. Aft Electronics Compartment
21. Armament Bay Door
22. Intermediate Electronics Compartment
23. Taxi Light
24. Intake Duct
25. Battery

*Major features of both Delta Dagger versions are indicated on this general arrangement drawing.* *(USAF)*

this book.

Early aircraft had problems with the main landing gear and brakes. These were fixed rather quickly in 1957 with the redesign of the main oleo strut metering pin and a rework of the side brace boss bearing. The original main landing gear was vertical, meaning it was perpendicular to the wing. Later gear was noticeably angled forward.

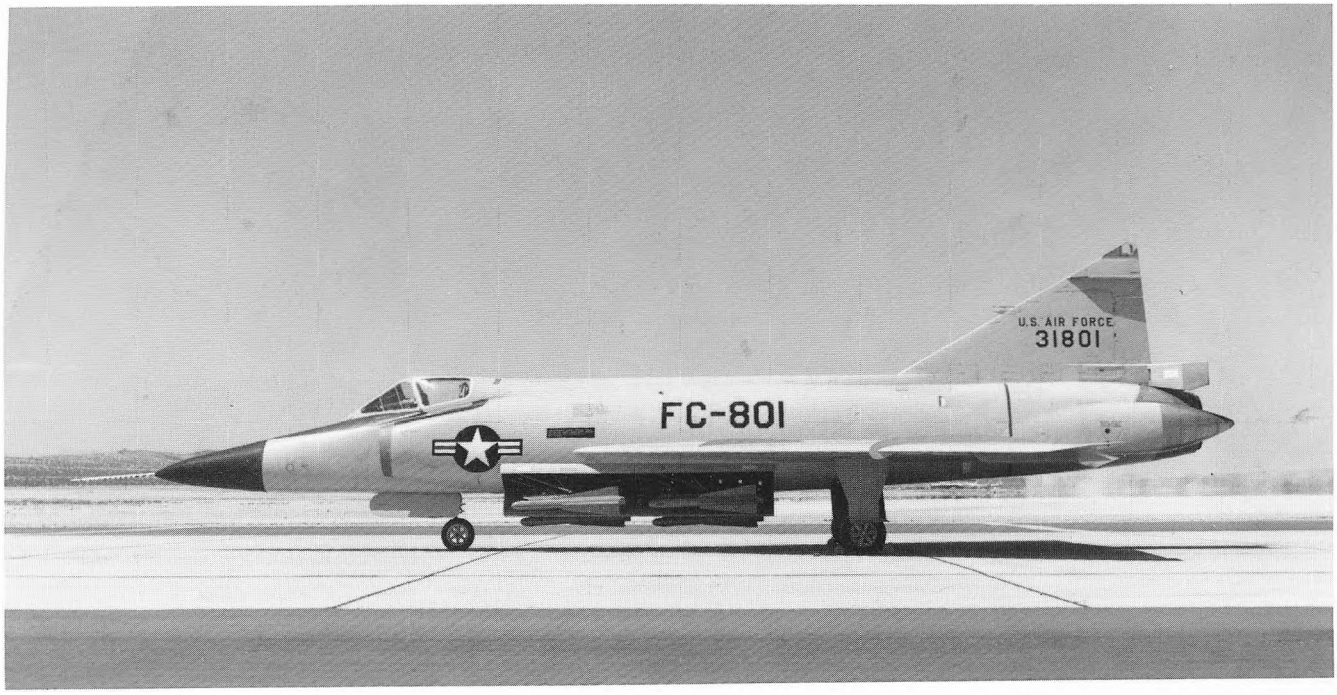
*This is the sole example of the YF-102C as photographed in 1960.* *(IAP)*

### Arming the Deuce

As stated previously, the armament for the F-102 was to consist of guided missiles and rockets. Like the fire control system, the guided missiles were designed and built by Hughes, and originally designated F-98. But this designation was replaced with GAR-1, which was subsequently changed to AIM-4. These Falcon missiles were produced in several versions, and the following table pairs the old and new designations with the type of guidance system used for variants that were often carried by the F-102A.

| Old Designation | New Designation | Guidance System |
|---|---|---|
| GAR-1D | AIM-4A | Radar |
| GAR-2A | AIM-4C | Infrared |
| GAR-3 | AIM-4E | Radar |
| GAR-3A | AIM-4F | Infrared |

Additionally, the infrared guided AIM-4D and AIM-4G could be carried. The usual load was three infrared mis-




*The F-102 was the first aircraft designed to carry missile armament in an internal bay. Six Falcon missiles of various types could be carried on retractable rails, and twenty-four unguided 2.75-inch rockets were located in tubes inside the doors. Here an early production F-102A is shown with its weapons bay open and the missile rails extended.*

*(USAF)*

*This early Falcon missile bears the designation YGAR-1. The man holding it provides a good comparison for the size of the missile.* *(Lundquist collection)*

siles and three semi-active radar guided missiles. Later, some aircraft were modified to carry the nuclear capable AIM-26 interchangeably with the AIM-4 in the center weapons bay. Those aircraft so modified had their 2.75-inch rocket capability reduced from twenty-four to twelve, because the doors for the center bay could no longer carry the rockets.

The rocket armament was carried in tubes inside the weapons bay doors. Two rockets were fitted inside each tube, one behind the other. During peacetime, only one rocket was fitted in each tube for safety reasons. The F-102A could fire six Falcons and all twenty-four rockets in less than ten seconds. Originally both two-inch and 2.75-inch rockets could be carried, but the two-inch rockets were deleted by the end of 1956. Later, the F-102s stopped carrying rockets altogether, and relied solely on their guided missile armament.

What appeared to be a bright blue missile was often seen on one of the F-102's missile rails. This was not actually a real missile but was a Weapon System Evaluation Missile (WSEM). It was a captive device that acted like a real missile right up to the point where it would be fired. It was used to evaluate the system and for training purposes. Additionally, tests were conducted with the Genie rocket which was capable of carrying a nuclear warhead, but it was never carried operationally. An F-102C was proposed in 1956, then referred to as the F-102X, which would have carried four Falcons and one MB-1 Genie like the F-106, but this proposal was dropped. Another F-102C proposal would have had a larger radar, but it too did not become operational.

*Because flying an aircraft with a delta wing was considerably different than flying one with a straight or swept wing, the Air Force ordered production of the TF-102A. It featured side-by-side seating for the student and instructor, and the resulting larger frontal cross section caused increased drag that prevented the aircraft from reaching supersonic speeds in level flight. The TF-102A also served as a trainer for the operation of the radar system. Note the* ***TC*** *prefix for the trainer's buzz number. This is the first TF-102A on the day it was rolled out and made public for the first time. Both the F-102A and TF-102A in this picture are fitted with the shorter vertical tail. (USAF)*

**A Deuce for Two**

With its first production aircraft with a delta wing about to enter service, the Air Force realized that the delta wing had some different flight characteristics than other wing designs. The trainers then in service, primarily the T-33, would not be adequate for training pilots to fly the F-102 to its limits. Also needed was an aircraft in which interceptor pilots could be effectively trained to do radar intercepts. This need had already been realized in the earlier interceptors. The solution was to take a basic F-102A airframe from the leading edge of the wing aft, and attach a wide nose section with side-by-side seating for the pilot and his instructor.

General Operational Requirements (GOR) were issued for the trainer version in April 1952, and on September 26, 1953, Convair was given the "go ahead" for work to begin. The mock-up inspection came in January 1954, but consisted of only the new nose section since the rest of the aircraft was the same as the basic fighter version. By that time, Convair had already received an order for the first twenty TF-102As, and the first flight of a production aircraft took place on November 8, 1955. It was quickly discovered that there was a serious buffeting problem at high speeds caused by the enlarged nose section and wide canopy. The first solution was to redesign the canopy by reducing it in height, but this restricted landing visibility too much. Convair went back to the original design but added numerous vortex generators to the canopy and windscreen. Although this did not completely eliminate the problem, it reduced it to a point that was acceptable to the Air Force. Performance was less than that of the F-102A, and the TF-102A was not supersonic in level flight due to the wide frontal section.

Although the TF-102A was designed to be fully combat capable, and was to have a complete fire control system and weapons, the fact was that many did not have the fire control system installed. They served merely as proficiency trainers, and usually two of them were assigned to a squadron. Eventually, 111 were built out of a planned order of 198.

**In Service**

The Deuce entered service with the 327th FIS at George AFB, California, in April 1956, far later than the

*Wearing the standard SEA camouflage scheme, this TF-102A completes its landing roll trailing its drag chute. (IAP)*

Air Force had wanted. It soon was deployed not only in the continental United States (CONUS) but in Alaska (AAC), Europe (USAFE), and the Pacific (PACAF) as well. The first overseas deployment was in June 1958, when the 327th FIS went to Thule, Greenland. USAFE, PACAF, and Alaska had F-102s beginning in early 1960. A summary of active Air Force Fighter Interceptor Squadrons (FIS) that operated the Deuce is shown in this listing:

**ADC**
2nd FIS, 4th FIS, 5th FIS, 11th FIS, 16th FIS, 25th FIS, 27th FIS, 31st FIS, 37th FIS, 40th FIS, 47th FIS, 48th FIS, 57th FIS, 59th FIS, 61st FIS, 64th FIS, 68th FIS, 71st FIS, 76th FIS, 86th FIS, 95th FIS, 318th FIS, 323rd FIS, 325th FIS, 326th FIS, 327th FIS, 329th FIS, 331st FIS, 332nd FIS, 431st FIS, 438th FIS, 456th FIS, 460th FIS, 482nd FIS, 497th FIS, 498th FIS, 525th FIS, 527th FIS, 4780th AD, 4781 CCTS, Air Defense Weapons Center.

**USAFE**
32nd FIS, 496th FIS, 526th FIS

**PACAF**
62nd FIS, 509th FIS

**Alaskan Air Command**
317th FIS

**Vietnam**

It was March 1962 when the first F-102s left Clark Air Base in the Philippines and headed for Tan Son Nhut Air Base in Vietnam. Using a six-week rotation of aircraft and air crews, Deuces remained there for a year. Starting in March 1963, no-notice deployments kept Delta Daggers at both Tan Son Nhut and Da Nang Air Bases. Twelve aircraft were assigned to the air defense of South Vietnam by the end of 1966, and they were evenly split between Bien Hoa and Da Nang. Ten more were stationed in neighboring Thailand, with six at Udorn and four at Don Muang. The last Deuce left SEA in December 1969. In the years that they served in Vietnam, they most often stood alert for the air defense mission, but also flew some escort missions for B-52s.

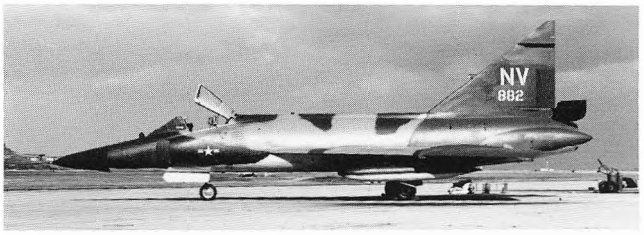
**The Air National Guard**

In 1960, the Air National Guard began receiving the F-102 to replace its aging F-89s and F-86Ds. The number of Deuces continued to rise until it peaked at about 340 aircraft in 1966. Twenty ANG squadrons from eighteen different states flew the F-102 until it was finally phased out. These squadrons, listed alphabetically by state, were as follows:

Arizona ANG, 152nd FIS

*Taken in July 1966, this photograph shows F-102As in the revetment area at Da Nang Air Base, South Vietnam. (USAF)*

*When they originally were assigned to Vietnam, both F-102As and TF-102As were painted in their usual ADC gray schemes, as seen in the 1964 photograph.* *(USAF)*




*But it was not long before they were camouflaged in the standard SEA paint scheme illustrated here. Somehow, it seemed a crime to paint an interceptor in this drab scheme, but it was also used later by some of the Air National Guard units in CONUS.* *(Mayer via Sullivan)*

California ANG, 194th FIS and 196th FIS
Connecticut ANG, 118th FIS
Florida ANG, 159th FIS
Hawaii ANG, 199th FIS
Idaho ANG, 190th FIS
Louisiana ANG, 122nd FIS
Minnesota ANG, 197th FIS
Montana ANG, 186th FIS
North Dakota ANG, 178th FIS
Oregon ANG, 123rd FIS
Pennsylvania ANG, 146th FIS
South Carolina ANG, 157th FIS
South Dakota ANG, 175th FIS
Texas ANG, 111th FIS and 182nd FIS
Vermont ANG, 134th FIS
Washington ANG, 116th FIS
Wisconsin ANG, 176th FIS

**Foreign Deuces**

Only two foreign air forces flew the Deuce, and in both cases, the aircraft were taken from the U.S. Air Force inventory rather than being built new for these two countries. In 1971, Greece received twenty-four F-102As and TF-102As, and Turkey received thirty-eight Deuces, three of which were two-seaters. It would be interesting to know the details of any combat that might have occurred between the F-102s of these two countries during the conflict over Cyprus in 1974.

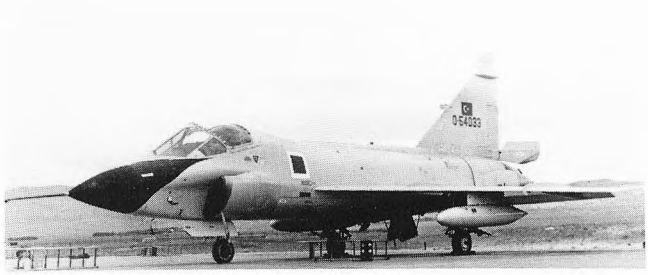
**In Summary**

For an aircraft that was only to be an "interim" interceptor, the Deuce served a long and successful life and helped to deter the Soviets or any other enemy from sending bombers against the United States. The biggest drawback to the F-102 was its lack of speed. It was a supersonic aircraft, but only by a small margin. With external tanks attached, it was limited to Mach .95. Once the faster F-101Bs and F-106s became available, its days were numbered. Since it was a great advantage to get to the bombers as fast as possible, or catch them if necessary, speed was essential, and the relatively slow Deuce had to make way for the faster interceptors. The fact that it was built in larger numbers than the F-101B or F-106 was because of delays in getting the "ultimate" F-106 into service, the minimal conventional armament carried by the F-101B, and the lack of funds to replace the F-102 on a one-for-one basis with the F-106 in particular.

There was also a change in priorities as well. First, the war in Vietnam placed a strain on the defense budget, and increased the need for fighter-bombers. There was very little need for fighter-interceptors in SEA. Budget constraints also dictated that since fewer aircraft could be built they had to have multi-role capabilities, so aircraft like the F-4 Phantom, that could drop bombs as well as shoot down other airplanes, got priority.

By the time the war in Vietnam ended, actions by the Defense Department seemed to indicate the Soviet

*Only two countries other than the United States flew the Delta Dagger. One was Greece, as shown in these two photographs. At left is an F-102A, and at right is a TF-102A in Greek markings. Both aircraft are in their standard ADC gray and still carry their USAF serial numbers.* *(Both IAP)*



*The other foreign nation to operate the Deuce was Turkey. Like Greece, Turkey applied only its national markings to the aircraft as illustrated here. Again, both the F-102A at left and the TF-102A at right remain in their ADC gray paint with USAF serial numbers. (Both IAP)*

bomber threat really was nothing much to worry about after all. The Army Air Defense Command (ARADCOM) was closed down completely, and the relatively few air defense Nike Hercules and Hawk missile sites that had defended the United States were dismantled. Not one single air defense missile was left to defend CONUS. The Aerospace Defense Command was absorbed into the Tactical Air Command, and the fighter interceptor squadrons were dismantled on a wholesale basis. As one upset Air Force colonel put it, "It used to be that almost every air base you flew over had an interceptor squadron stationed there to defend our skies. But now there are so very few aircraft dedicated to the defense of our homeland it is hard to find a base that still has an interceptor squadron." It no longer seemed important to stop every nuclear bomber. Scenarios, played out on computers, have shown Soviet bombers entering U.S. air space and flying around at will with no opposition. One ADC pilot shook his head when he observed one of these scenarios played out in which only one Soviet bomber was destroyed off the Virginia coast. "It makes you wonder where our priorities are," he said.

Certainly the inter-continental ballistic missile has replaced the bomber as the primary means of delivering nuclear weapons between nations, but the Soviets have continued to build more and better bombers that can strike the United States. Newer bombers have been designed and become operational since the missile batteries were dismantled and the interceptors scrapped. Like the U.S., the Soviets have their own strategic triad of ICBMs, submarine-launched ballistic missiles, and bombers. But we have shut down ARADCOM, failed to replace our interceptors with new aircraft that can adequately do the job, negotiated away almost all of the anti-ballistic missile (ABM) system. We failed to build what little of the ABM system we were permitted to after the negotiations. It has been said that America has never lost a war nor won a negotiation. Any attempt to build a defensive weapon or system, from the Strategic Defense Initiative to the ASAT missile, brings on shouts of protests from everyone from the Soviets to U.S. politicians, and from celebrities who want their name in print to "concerned" scientists with no alternative to offer. This writer once toured NORAD Headquarters at Cheyenne Mountain, Colorado. As one Air Force officer stationed there put it, "We no longer have much to defend our country with, we just have a good place to watch the war." By contrast, there are thousands of surface to air missiles (SAMs) defending Warsaw Pact nations and thousands more defending the Soviet Union. Soviet client states and other Soviet supplied nations have more missiles defending their cities and military than the United States has in the entire world! The Soviets have deployed an anti-ballistic missile system around Moscow, and have strengthened, not weakened, their interceptor forces. Maybe this is because they still remember what it is like to have their cities bombed. The United States does not, because history has been kind to us.

*Taken in 1971, this photograph shows F-102A, 56-1282, in the markings of the 317th FIS, which was assigned to the Alaskan Air Command. The vertical tail and wing tips are painted red. (IAP)*

It is not the purpose of this narrative to go into a long comment about the decisions made by the Department of Defense. But it is meaningful to contrast the thinking and the urgency that brought the F-102 into existence, and what we have now. Back then, it was important to build a defense in such depth that not one bomber could attack our country with a nuclear weapon. The Air Force wanted a new interceptor, and it wanted it so urgently that it was ready to trade off capabilities to get the aircraft operational as quickly as possible. Today, it seems that defending the airspace above the United States is really not one of our top priorities. With no surface-to-air missiles and very few aircraft assigned the sole mission of defending the North American continent, one wonders just what rationale could have lead to this situation.

# F-102A

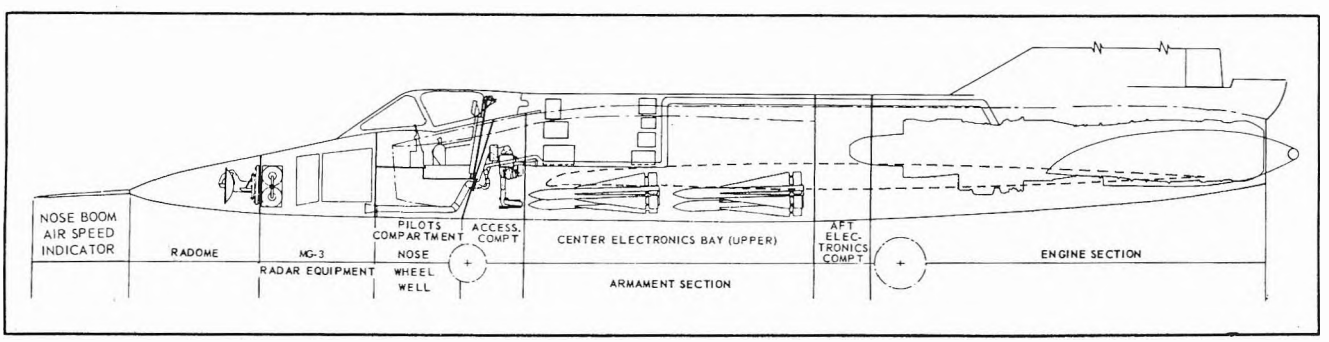
*This F-102A was photographed while on alert for Exercise Big Lift in November 1963. This was a demonstration of strategic mobility for reinforcement of NATO forces in Germany. (USAF)*

The F-102A (Convair Model 8-10, Weapon System WS-201A) was the only fighter version of the Delta Dagger placed into production. The subsequent F-102B designation was later changed to F-106A because of all of the changes made to that airframe and its components. The TF-102A was officially a "proficiency trainer," and although it could carry the same weapons as the F-102A, many of the two-seaters did not even have the fire control system installed.

A name given to the F-102 during its development was a misnomer. It was referred to as the "interim interceptor." This name came about because the Air Force realized that it needed an all-weather interceptor with considerably better capabilities than those already in service (F-86D/-K, F-89, and F-94), but it was also clear that it could not wait until an interceptor that met all the desirable requirements could be produced. Therefore, the F-102A became the "interim interceptor," being an improvement over those already in service but something less than what was really wanted. The Air Force would wait for its "ultimate interceptor," the F-106, until later. It was envisioned that the "interim interceptor" would be built in smaller numbers to "hold the line" until the "ultimate interceptor" could be placed in production and enter service in greater numbers. It should be noted that the term "ultimate interceptor" itself was a misnomer as well. By "ultimate" the Air Force intended to mean an interceptor with all the features and capabilities that it could reasonably expect considering technological advancements and the ever-present budget constraints. It did not mean "ultimate" in the sense of the word that the interceptor would be **everything** the Air Force wanted. No weapons system has been, is, or ever will be "ultimate" in this meaning of the term.

But what actually happened with the F-102A was that it was built in far greater numbers than the "ultimate" F-106. A total of 889 F-102As were produced, 875 of which were used in the operational inventory. This compares to only 275 F-106As which includes the two prototypes.

The F-102A was powered by a Pratt & Whitney J57-P-23A or -25, axial flow engine with one low pressure spool and one high pressure spool. It was 248 inches long, 40.2 inches wide, and weighed 5,045 pounds. It had an automatic two-position tail pipe with afterburner. Maximum static thrust in afterburner was 16,000 pounds, and this could be maintained for up to five minutes. Military power provided 10,200 pounds of thrust for up to thirty minutes.



Normal power, which could be maintained as long as there was fuel, was 8,700 pounds of thrust.

The options for arming the F-102A included up to twenty-four 2.75-inch free-flight rockets located in tubes in the weapons bay doors. For aircraft modified to carry the AIM-26 in the center bay, the number of rockets was reduced to twelve, and the tubes in the center two doors were removed. Two rockets could be placed in each of the twelve tubes, but during peacetime only one rocket per tube was usually carried. The rocket armament was subsequently discontinued entirely.

Up to six Falcon air-to-air missiles could be carried. Various mixes of the different versions of the missile, both IR and radar guided, could be fitted to the rails. Some aircraft were modified by T.O. 1F-102A-620 to carry one or two AIM-26 nuclear-capable Falcons on the rails in the center bay. Most of the time, half of the standard Falcons (either two or three) were IR guided, and half were radar guided.

The following table provides a summary of the various weights and conditions for the F-102A.

| | |
|---|---|
| Empty | 19,350 pounds |
| Basic | 19,530 pounds |
| Design | 25,500 pounds |
| Combat | 25,262 pounds |
| Maximum take-off (normal) | 28,250 pounds |
| Maximum take-off (overload) | 31,276 pounds |
| Maximum in flight | 31,276 pounds |
| Maximum landing | 28,230 pounds |

The internal wing tanks had a capacity of 1,085 gallons, and an additional 430 gallons could be carried in two external tanks mounted on pylons under the wings. However, if these external tanks were fitted, the aircraft was limited to Mach .95. The F-102A was not capable of being refueled in flight.

In addition to the MG-10 fire control system, the F-102A was fitted with the following electronics:

| | |
|---|---|
| UHF Command | AN/ARC-34 |
| Interphone | AN/AIC-10 |
| Marker Beacon | AN/ARN-12 or 32 |
| TACAN | AN/ARN-21 |
| ILS Receiver | AN/ARN-31 |
| IFF/SIF | AN/APX-6A or 25 |
| AIMS | AN/APX-72 |
| Compass System | J-4 |

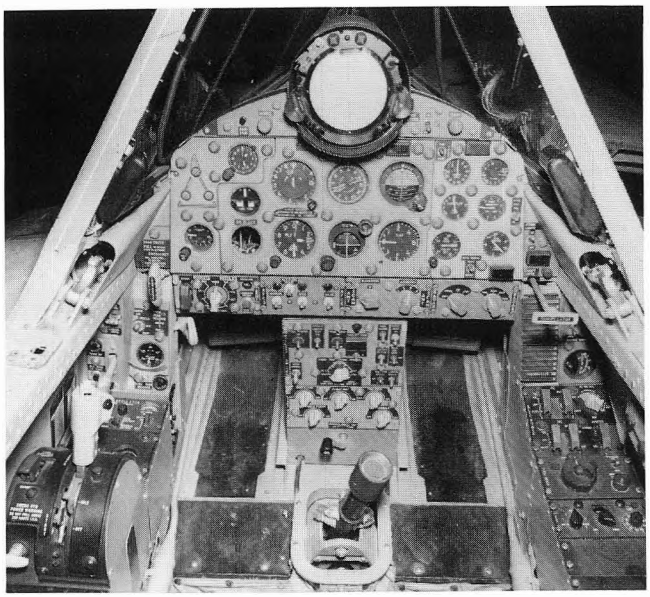
The following table provides F-102A performance data for three different missions under stated conditions of take-off weights, armament, and power used.

| CONDITIONS | POINT INTERCEPT (1) | AREA INTERCEPT (2) | FERRY (2) |
|---|---|---|---|
| Take-off weight (lbs.) | 28,150 | 31,276 | 31,276 |
| Wing loading (lbs./sq. ft.) | 40.4 | 44.8 | 44.8 |
| Ground run at max. power (ft.) | 2,290 | 2,800 | 2,800 |
| Rate of climb at S.L. (ft./min.) | 17,400 (4) | 4,500 (5) | 4,400 |
| Time: S.L. to 50,000 ft. (min.) | 7.8 (4) | 24.5 (5) | 24.5 (5) |
| Service ceiling (ft.) | 53,400 (4) | 39,200 (5) | 38,100 (5) |
| Combat range (n. mi.) | --- | --- | 1,204 |
| Combat radius (n. mi.) | (6) | 335 | --- |
| Max speed at 35,000 ft. (kts.) | 677 | 676 | 684 |
| Landing weight (lbs.) | 22,062 | 22,557 | 22,557 |
| Ground roll at S.L. (ft.) | 2,450 | 2,510 | 2,510 |
| Ground roll w/aux. brakes (3) (ft.) | 1,780 | 1,830 | 1,830 |

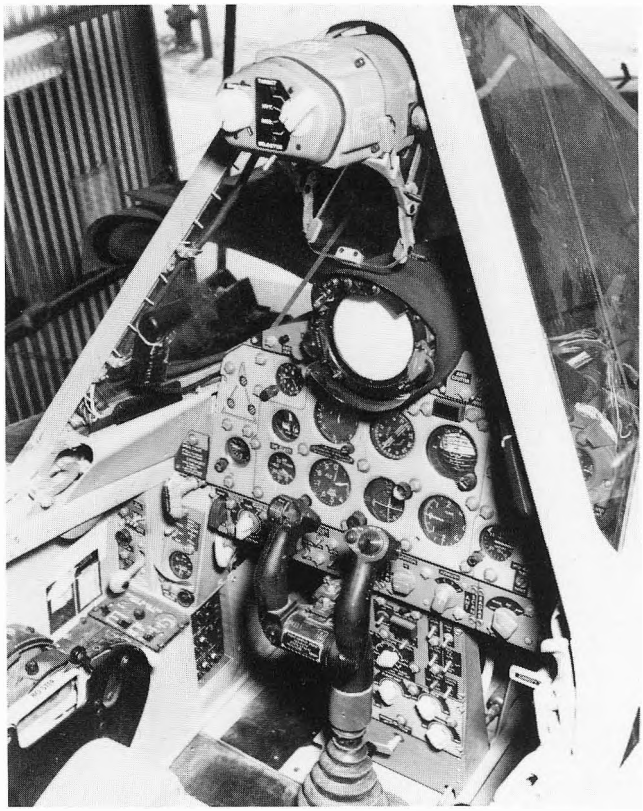
Notes:

1. A point intercept mission is with no external tanks and an armament of six Falcon missiles and twelve 2.75-inch rockets. The aircraft returns to the same point from which it took off.
2. An area intercept mission and a ferry mission are with the same armament as the point intercept mission except that 430 gallons of external fuel are carried. For the area intercept mission, the aircraft returns to the same point from which it took off. For the ferry mission, the range figure given is the maximum distance the aircraft can fly from the take-off point before it must land.
3. The term "auxiliary brakes" means the use of speed brakes and drag chute.
4. Data assumes maximum power in afterburner.
5. Data assumes military power.
6. There is no combat radius for a point intercept mission since the aircraft is assumed to be protecting the point from which it took off. Instead, the mission is based on a time the aircraft can stay in the air above or near that point. In the example case given, that time would be 1.4 hours.

Source: Standard Aircraft Characteristics, U.S. Air Force.



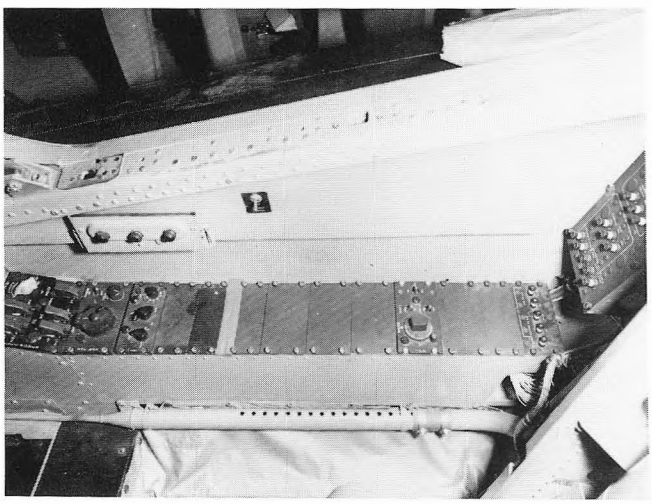
*Although the cockpit of the F-102A underwent numerous small changes throughout its production and operational life, this photograph illustrates the general cockpit layout. The control yoke has been removed to show more details. The dominant feature of the cockpit in any all-weather interceptor was the radar scope which was located at the top center of the instrument panel on the F-102A. (Convair/General Dynamics)*



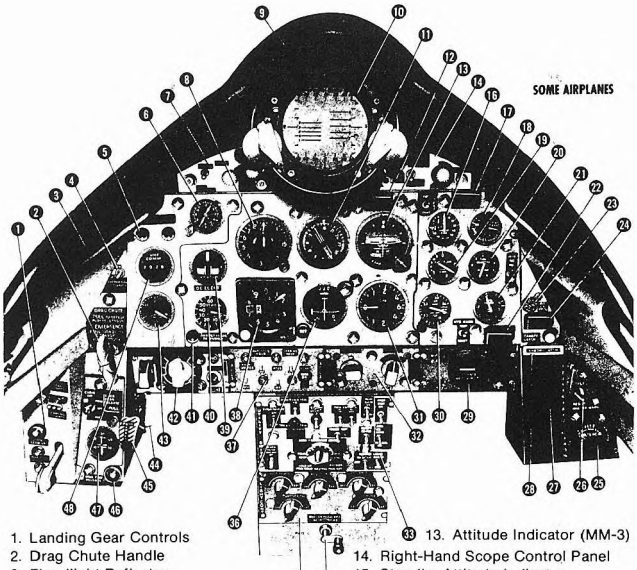
*The Y-shaped control yoke is visible here. The right side was used to fly the aircraft in the conventional manner, while the left side, which moved independently from the rest of the yoke, was used to control the radar. Also visible in this view is the optical sight that was added beginning in 1958. Needless to say, visibility to the front was not the best! (Convair/General Dynamics)*

# F-102A COCKPIT DETAILS

*This is the left console in an early F-102A. (Convair/General Dynamics)*

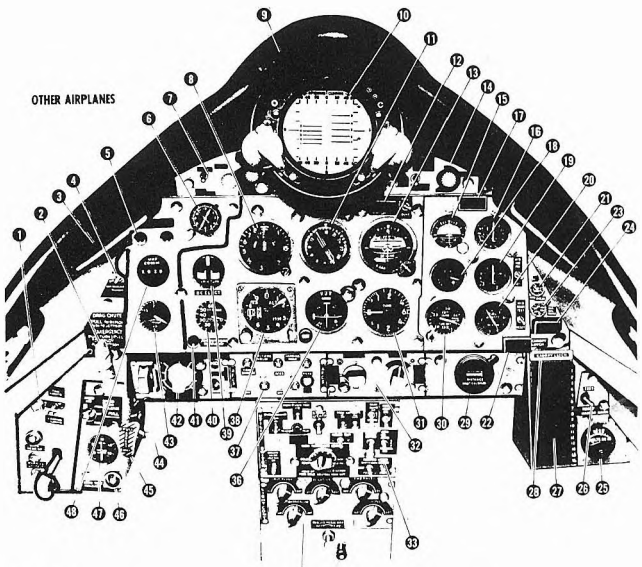


*This is a manufacturer's photo of the right console, but based on the drawing on the next page and the photographs on page 36, it is clear that much more equipment was added. (Convair/General Dynamics)*



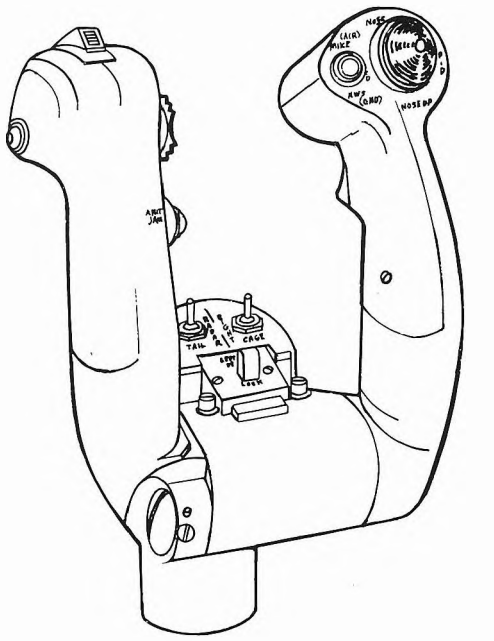

1. Landing Gear Controls
2. Drag Chute Handle
3. Floodlight Reflector
4. External Tank Fuel Transfer Switch
5. Landing Gear Position Indicators
6. Clock
7. Left-Hand Scope Control Panel
8. Airspeed-Mach Indicator
9. Glare Shield
10. Radar Scope
11. Radio Magnetic Indicator
12. Engine Fire and Overheat Warning Light
13. Attitude Indicator (MM-3)
14. Right-Hand Scope Control Panel
15. Standby Attitude Indicator
16. Tachometer
17. Master Warning Light
18. Exhaust Gas Temperature Gage
19. Fuel Flow Indicator
20. Fuel Quantity Gage
21. Hydraulic Pressure Gage
22. Hydraulic Pressure Low Warning Light
23. Oil Pressure Gage
24. Canopy Unlocked Warning Light

*Details of the main instrument panel are shown here.* *(USAF)*



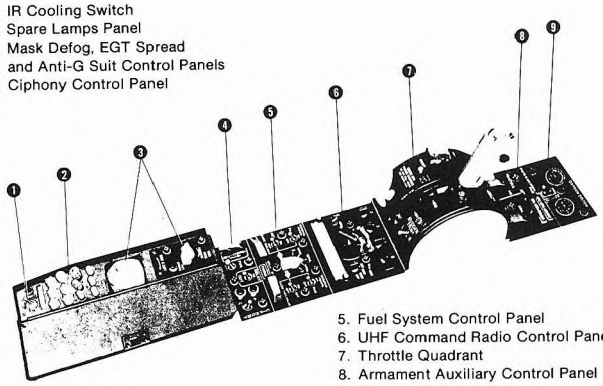

25. AC Voltmeter
26. Master Warning Test and Reset Switch
27. Warning Light Panel
28. Canopy Latch Handle
29. Tacan Range Indicator Panel
30. Engine Pressure Ratio Gage
31. Vertical Velocity Indicator
32. Antenna Scanning Control Panel
33. Utility Switch Panel
34. Rudder Adjustment Crank
35. Lighting Control Panel
36. Course Indicator
37. AFCS Control Panel
38. Altimeter
39. Turn-and-Slip Indicator
40. Target Altitude Indicator
41. Arrest Hook Light
42. Armament Control Panel
43. Command Mach Indicator
44. Landing Gear Emergency Extension Handle
45. Arrest Hook Release Handle
46. Wing Tank Release Button
47. Cabin Pressure Altitude Gage
48. Remote Indicator (UHF)

## consoles (typical)



*Details of the control yoke are shown here.*

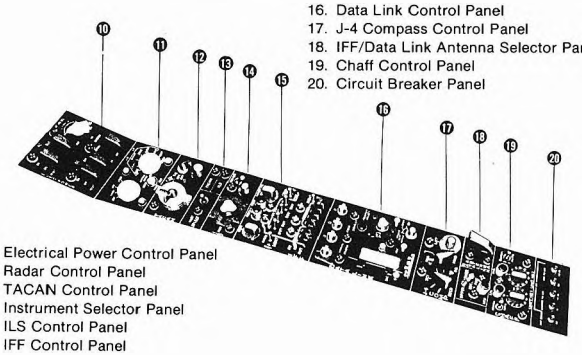
1. IR Cooling Switch
2. Spare Lamps Panel
3. Mask Defog, EGT Spread and Anti-G Suit Control Panels
4. Ciphony Control Panel



5. Fuel System Control Panel
6. UHF Command Radio Control Panel
7. Throttle Quadrant
8. Armament Auxiliary Control Panel
9. Oxygen Control Panel

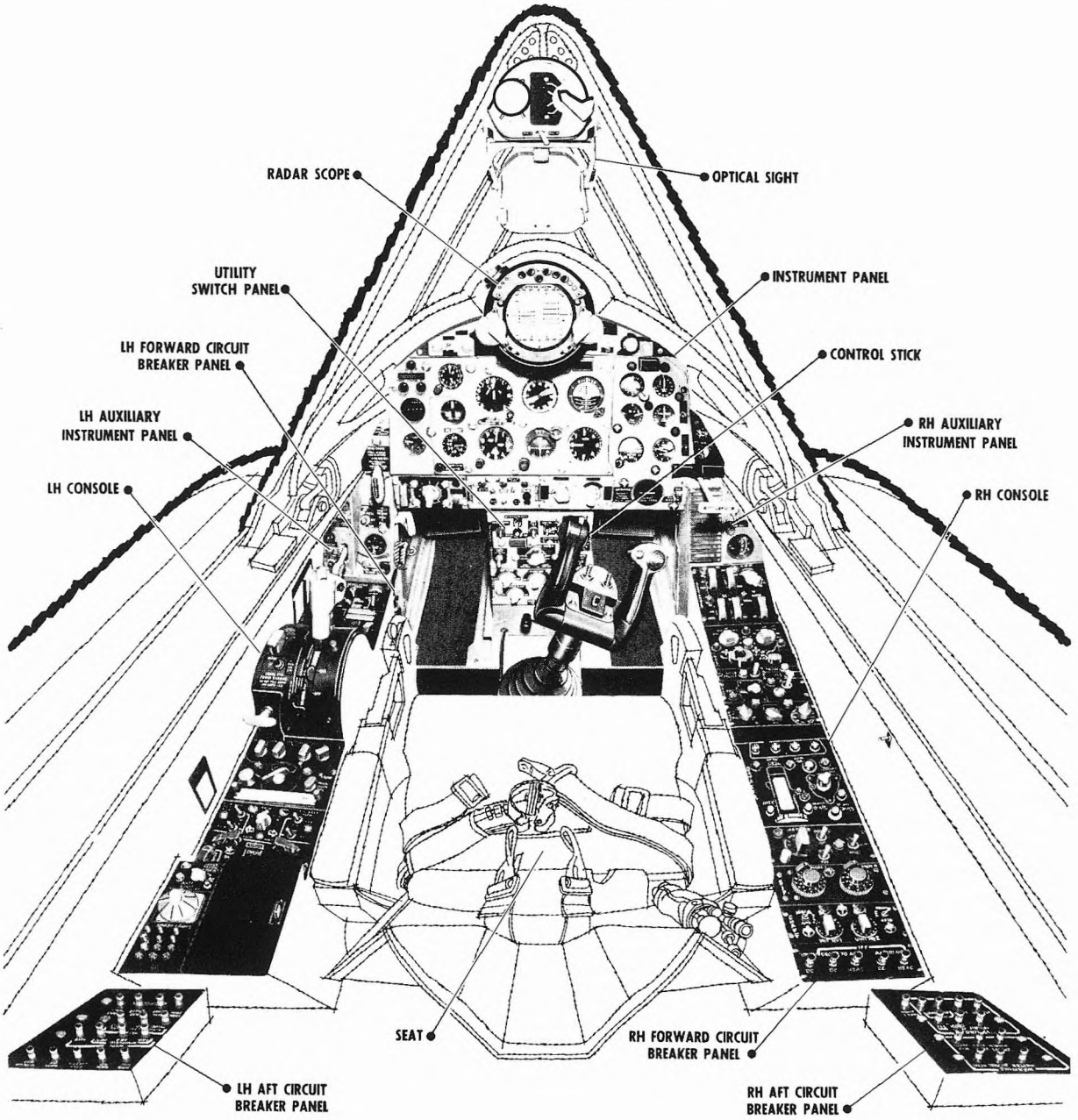
*This drawing and key identifies the items on the left console.* *(USAF)*

16. Data Link Control Panel
17. J-4 Compass Control Panel
18. IFF/Data Link Antenna Selector Panel
19. Chaff Control Panel
20. Circuit Breaker Panel



10. Electrical Power Control Panel
11. Radar Control Panel
12. TACAN Control Panel
13. Instrument Selector Panel
14. ILS Control Panel
15. IFF Control Panel

*Features of the right console are indicated on this drawing.* *(USAF)*

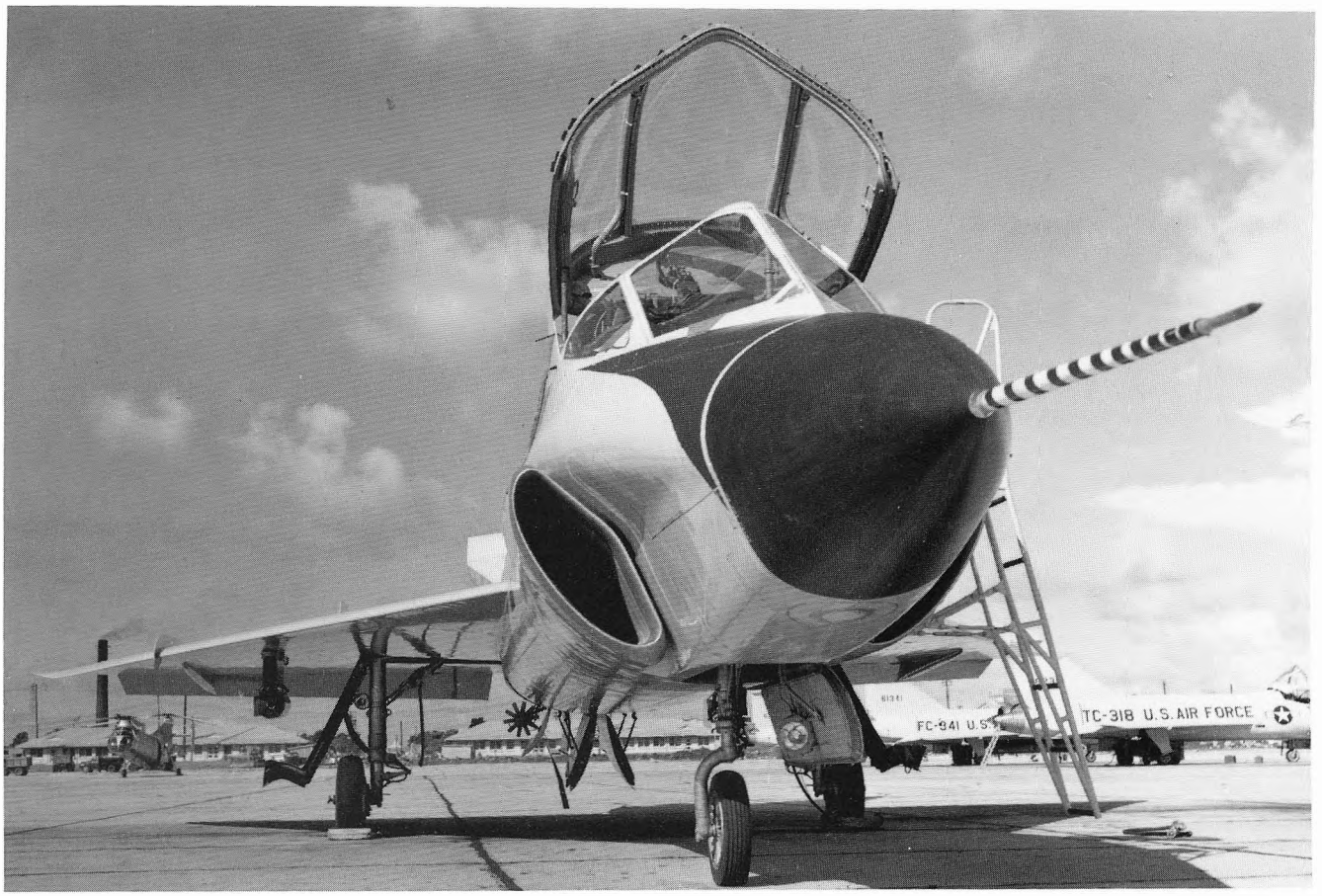



*This drawing illustrates the layout of the cockpit in an F-102A.* *(USAF)*

Production blocks and serial numbers for the F-102A and the prototypes were as follows:

| Block | Serials |
|---|---|
| YF-102 | 52-7994 and 52-7995 |
| YF-102A | 53-1787 through 53-1790 |
| F-102A-5-CO | 53-1791 through 53-1794 |
| F-102A-10-CO | 53-1795 through 53-1797 |
| F-102A-15-CO | 53-1798 through 53-1802 |
| F-102A-20-CO | 53-1803 through 53-1811 |
| F-102A-25-CO | 53-1812 through 53-1818 |
| F-102A-30-CO | 54-1371 through 54-1383 |
| F-102A-35-CO | 54-1384 through 54-1400 |
| F-102A-40-CO | 54-1401 through 54-1407 |
| F-102A-41-CO | 55-3357 through 55-3379 |
| F-102A-45-CO | 55-3380 through 55-3426 |
| F-102A-50-CO | 55-3427 through 55-3464 |
| F-102A-51-CO | 56-0957 through 56-0972 |
| F-102A-55-CO | 56-0973 through 56-1044 |
| F-102A-60-CO | 56-1045 through 56-1136 |
| F-102A-65-CO | 56-1137 through 56-1233 |
| F-102A-65-CO | 56-1317 through 56-1320 |
| F-102A-70-CO | 56-1234 through 56-1274 |
| F-102A-70-CO | 56-1321 through 56-1331 |
| F-102A-75-CO | 56-1275 through 56-1316 |
| F-102A-75-CO | 56-1332 through 56-1429 |
| F-102A-80-CO | 56-1430 through 56-1518 |
| F-102A-90-CO | 57-0770 through 57-0855 |
| F-102A-95-CO | 57-0856 through 57-0909 |

# TF-102A

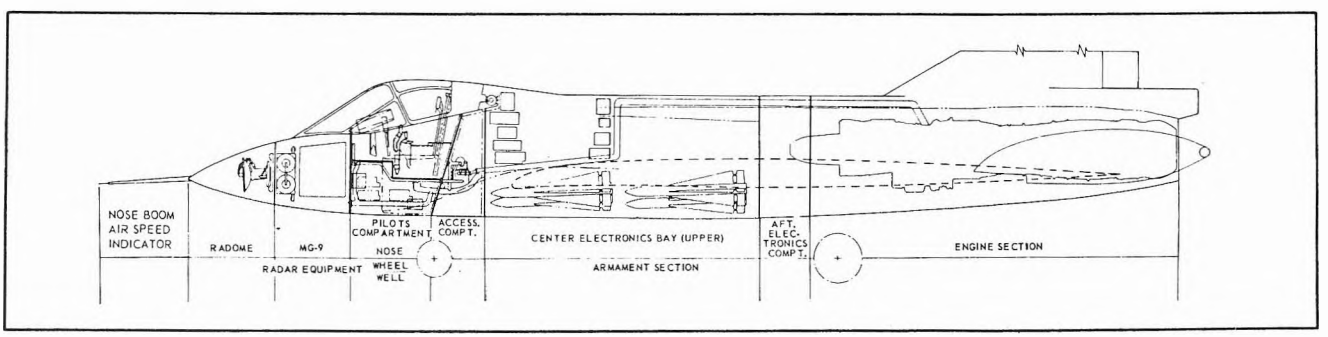



*The larger frontal cross section and the modified air intakes are illustrated in this front view of a TF-102A taken at Tyndall AFB, Florida. The opened canopy provides a look at the framework from the inside. (USAF)*

Other than the F-102A, the TF-102A (Convair Model 8-12, Weapon System WS-210L) was the only variant of the Delta Dagger produced. From the leading edge of the wing rearward it was essentially the same as the F-102A, but the side-by-side seating arrangement of the instructor and student in the cockpit meant a much larger frontal section. The TF-102A could be fitted with the MG-10 fire control system and carry the same armament as the fighter versions, but many of them did not have these systems. Those modified by T.O. 1F-102(T)A-541 could carry the AIM-26 missile, but the capacity of rockets was reduced to twelve. TF-102As that did have a fire control system were often used to train pilots how to run radar interceptor missions in all kinds of weather and at night. Usually two were assigned to a squadron, and they were used as proficiency trainers. Only 111 of the original order of 198 were built.

Like the F-102A, the two-seat Deuce was powered by a Pratt & Whitney J57-P-23A or -25 engine with the same data and ratings as given in the F-102A section. The fuel capacities were also the same as those in the single-seater as were the electronics, expect that the TF-102A did not have the J-4 compass system or the AN/APX-72 AIMS. The cambered Case XX wing replaced the Case X wing beginning with 56-2336. Weights varied from those of the F-102A, and are summarized in the following table:

| | |
|---|---|
| Empty | 19,562 pounds |
| Basic | 19,954 pounds |
| Design | 26,800 pounds |



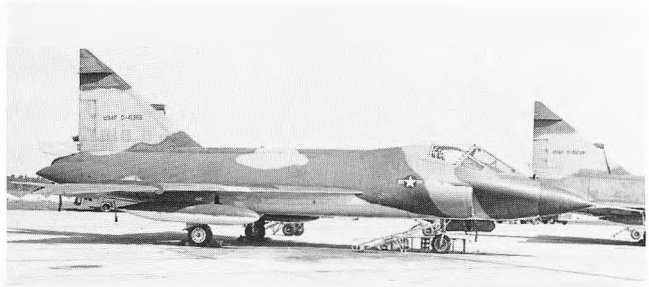
| | |
|---|---|
| Combat | 25,700 pounds |
| Maximum take-off | 32,104 pounds |
| Maximum landing | 29,530 pounds |

Production blocks and serial numbers for the TF-102A were as follows:

| Blocks | Serials |
|---|---|
| TF-102A-5-CO | 54-1351 through 54-1354 |
| TF-102A-10-CO | 54-1355 through 54-1359 |
| TF-102A-15-CO | 54-1361 through 54-1365 |
| TF-102A-20-CO | 54-1366 through 54-1368 |
| TF-102A-25-CO | 54-1369 through 54-1370 |
| TF-102A-26-CO | 55-4032 through 55-4034 |
| TF-102A-30-CO | 55-4035 through 55-4042 |
| TF-102A-35-CO | 54-1360 (one only) |
| TF-102A-35-CO | 55-4043 through 55-4050 |
| TF-102A-35-CO | 56-2317 through 56-2323 |
| TF-102A-36-CO | 55-4051 through 55-4056 |
| TF-102A-37-CO | 55-4057 through 55-4059 |
| TF-102A-40-CO | 56-2324 through 56-2335 |
| TF-102A-41-CO | 56-2336 through 56-2353 |
| TF-102A-45-CO | 56-2354 through 56-2379 |

Additionally, serial numbers 56-2380 through 56-2466 were assigned to the TF-102A production program, but these eighty-seven aircraft were cancelled.

*TF-102A, 55-4041, is shown here during 1973 in the markings of the Hawaii ANG. (IAP)*



*Like many of its single-seat counterparts, some of the TF-102As were painted in the drab SEA camouflage scheme. (IAP)*

The following table provides TF-102A performance data for three different missions under stated conditions of take-off weights, armament, and power used.

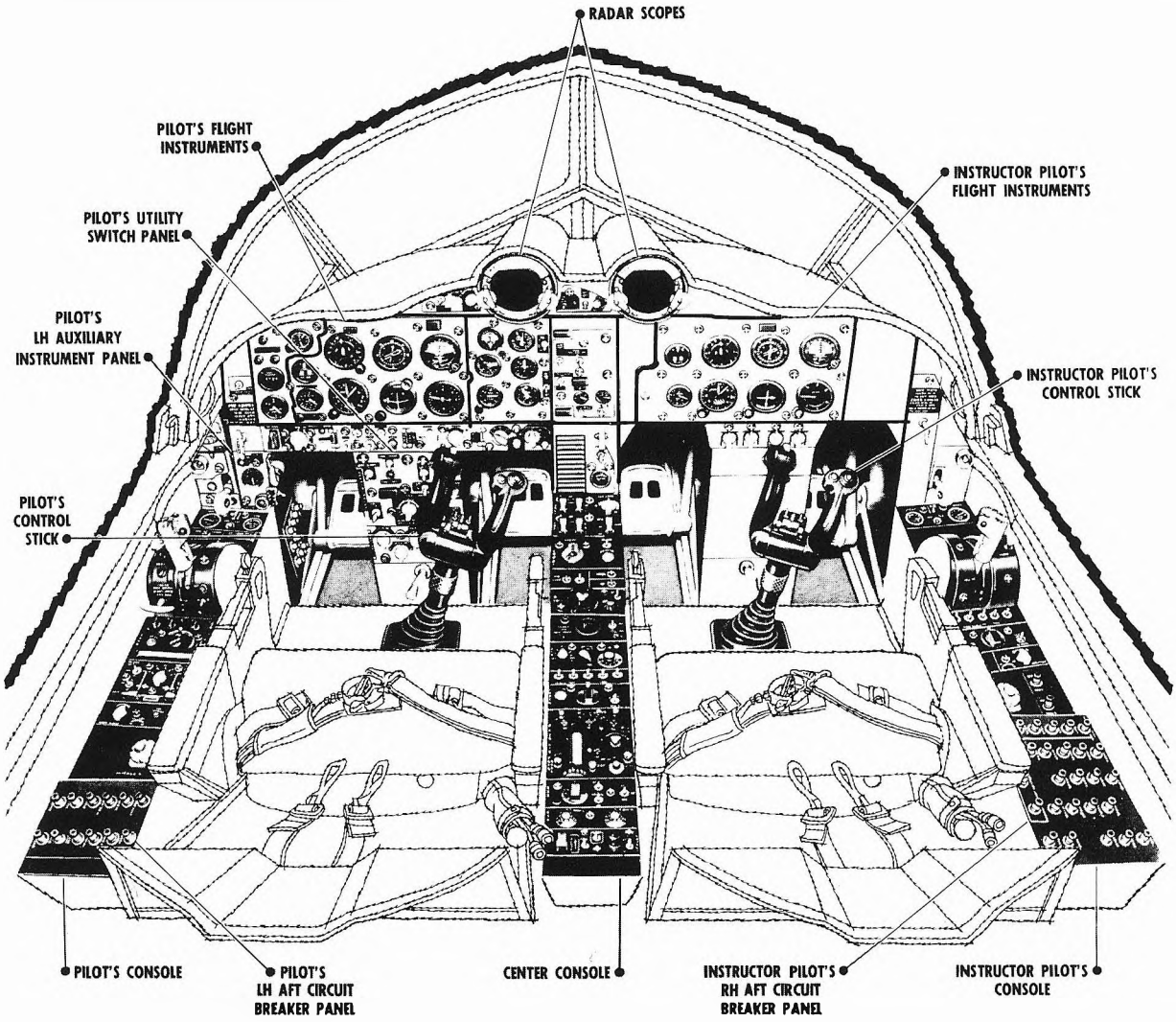
| CONDITIONS | POINT INTERCEPT (1) | AREA INTERCEPT (2) | FERRY (2) |
|---|---|---|---|
| Take-off weight (lbs.) | 28,978 | 32,104 | 32,104 |
| Wing loading (lbs./sq. ft.) | 41.3 | 45.8 | 45.8 |
| Ground run at max. power (ft.) | 2,400 | 2,990 | 2,990 |
| Rate of climb at S.L. (ft./min.) | 13,450 (4) | 4,550 (5) | 4,400 |
| Time: S.L. to 40,000 ft. (min.) | 5.1 (4) | 24.8 (5) | 25.0 (5) |
| Service ceiling (ft.) | 50,250 (4) | 38,800 (5) | 37,100 (5) |
| Combat range (n. mi.) | --- | --- | 1,029 |
| Combat radius (n. mi.) | (6) | 443 | --- |
| Max speed at 35,000 ft. (kts.) | 566 | 566 | 567 |
| Landing weight (lbs.) | 22,821 | 23,309 | 23,309 |
| Ground roll at S.L. (ft.) | 3,210 | 3,240 | 3,240 |
| Ground roll w/aux. brakes (3) (ft.) | 2,180 | 2,230 | 2,230 |

Notes:

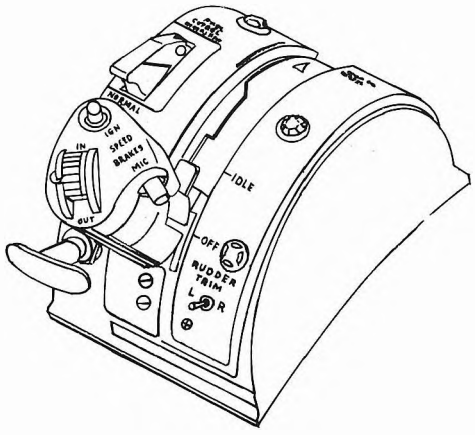
1. A point intercept mission is with no external tanks and an armament of six Falcon missiles and twenty-four 2.75-inch rockets. The aircraft returns to the same point from which it took off.
2. An area intercept mission and a ferry mission are with the same armament as the point intercept mission except that 430 gallons of external fuel are carried. For the area intercept mission, the aircraft returns to the same point from which it took off. For the ferry mission, the range figure given is the maximum distance the aircraft can fly from the take-off point before it must land.
3. The term "auxiliary brakes" means the use of speed brakes and drag chute.
4. Data assumes maximum power in afterburner.
5. Data assumes military power.
6. There is no combat radius for a point intercept mission since the aircraft is assumed to be protecting the point from which it took off. Instead, the mission is based on a time the aircraft can stay in the air above or near that point. In the example case given, that time would be 1.4 hours.

Source: Standard Aircraft Characteristics, U.S. Air Force.

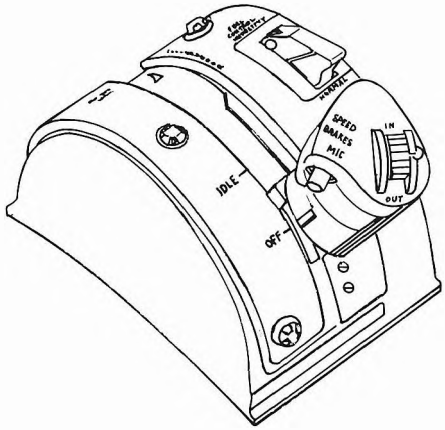
# TF-102A COCKPIT DETAILS




*The typical general arrangement of the cockpit in the two-seat Delta Dagger is illustrated in this drawing. (USAF)*

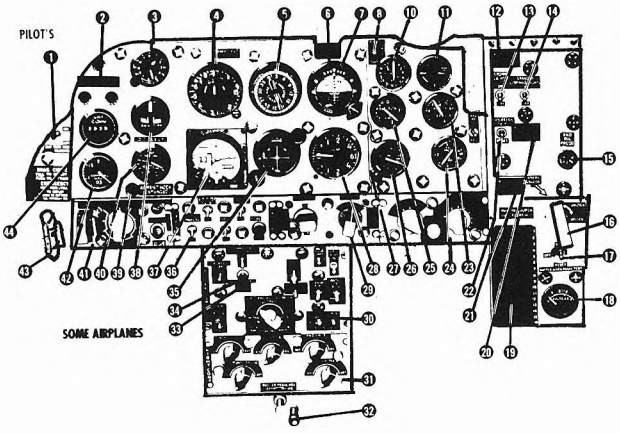


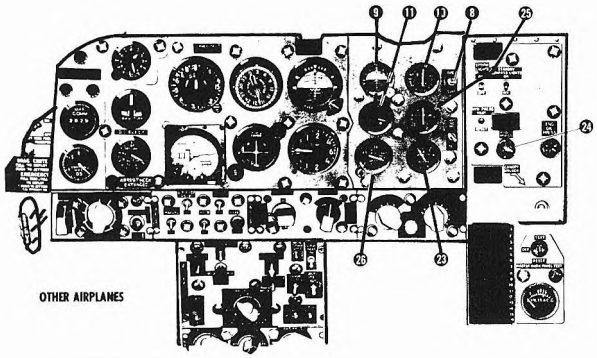

*The throttle used in the F-102A and on the left side of the TF-102A is shown in this drawing.*



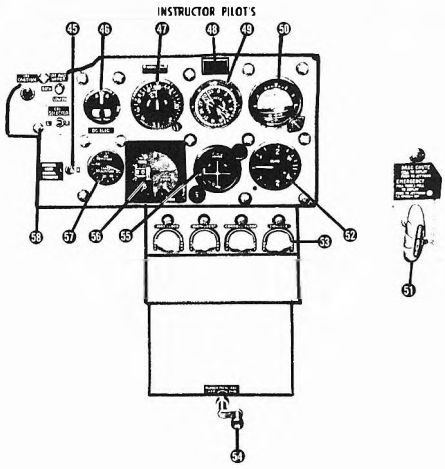

*A reversed throttle was located on the right console of the TF-102A.*

## instrument panel (typical)



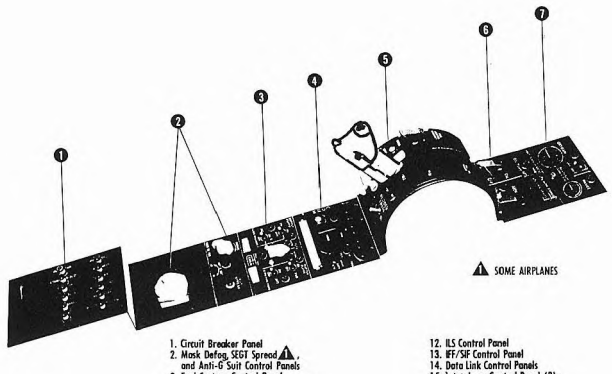

*Two different arrangements for the pilot's instrument panel are shown in these drawings.* *(USAF)*



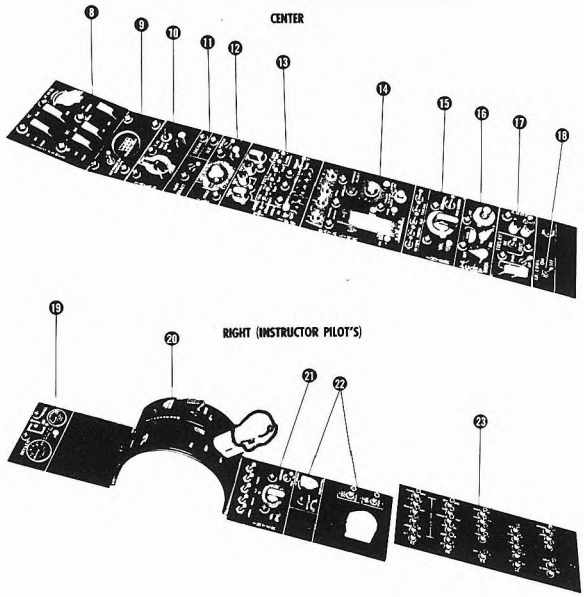

1. External Tank Fuel Transfer Switch
2. Landing Gear Position Indicators
3. Clock
4. Airspeed-Mach Indicator
5. Radio Magnetic Indicator
6. Engine Fire and Overheat Warning Light
7. Attitude Indicator (MM-3)
8. Engine Fire Warning Test Switch
9. Standby Attitude Indicator
10. Tachometer
11. Exhaust Gas Temperature Gage
12. Master Warning Light
13. Thunderstorm Lights Switch
14. Magnetic Compass Light Switch
15. Oil Pressure Gage
16. Canopy Latch Handle
17. Master Warning Test and Reset Switch
18. AC Voltmeter
19. Warning Light Panel
20. Hydraulic Pressure Low Warning Light
21. Canopy Unlocked Warning Light
22. Hydraulic Pressure Low Warning Light Test and Reset Switch
23. Fuel Quantity Gage
24. Hydraulic Pressure Gage
25. Fuel Flow Indicator
26. Engine Pressure Ratio Gage
27. Radar Control Panel
28. Vertical Velocity Indicator
29. Antenna Scan Control Panel
30. Utility Switch Panel
31. Lighting Control Panel
32. Rudder Pedal Adjustment Crank
33. Takeoff Trim Indicator Light
34. Takeoff Trim Button
35. Course Indicator
36. AFCS Control Panel
37. Altimeter
38. Turn-and-Slip Indicator
39. Arrest Hook Light
40. Target Altitude Indicator
41. Armament Control Panel
42. Command Mach Indicator
43. Drag Chute Handle
44. Remote Indicator (UHF)
45. Antenna Hand Control Transfer Switch
46. Turn-and-Slip Indicator
47. Airspeed-Mach Indicator
48. Engine Fire and Overheat Warning Light
49. Radio Magnetic Indicator
50. Attitude Indicator (MM-3)
51. Drag Chute Handle
52. Vertical Velocity Indicator
53. Lighting Control Panel
54. Rudder Pedal Adjustment Crank
55. Course Indicator
56. Altimeter
57. Target Altitude Indicator
58. IFF Antenna Selector Panel

*This is the instructor pilot's instrument panel. The keys apply both to this panel and the pilot's panels shown at left.* *(USAF)*

## consoles (typical)




1. Circuit Breaker Panel
2. Mask Defog, SEGT Spread ⚠, and Anti-G Suit Control Panels
3. Fuel System Control Panel
4. UHF Command Radio Control Panel
5. Throttle Quadrant (P)
6. Armament Auxiliary Control Panel
7. Oxygen Control Panel (P)
8. Electrical Power Control Panel
9. Tacan Range Indicator Panel
10. Tacan Control Panel
11. Instrument Selector Panel
12. ILS Control Panel
13. IFF/SIF Control Panel
14. Data Link Control Panels
15. Interphone Control Panel (P)
16. J-4 Compass Control Panel
17. Ciphony Control Panel ⚠
18. IR Cooling Switch ⚠
19. Oxygen Control Panel (IP)
20. Throttle Quadrant (IP)
21. Interphone Control Panel (IP)
22. Mask Defog and Anti-G Suit Control Panels (IP)
23. Circuit Breaker Panel




*These drawings indicate the details of the three consoles in the TF-102A.* *(USAF)*

# PILOT'S REPORT

*Personnel from the 27th FIS pose in front of one of their Delta Daggers. Ken Lundquist is sixth from the right in the front row.* *(Lundquist)*

*Note: Ken Lundquist is a member of IPMS Atlanta and a former F-102 pilot. Ken kindly offered to write a pilot's report for this book to share some of the experiences he had while flying the Delta Dagger. His hours in the Deuce were flown early in the operational life of the aircraft. Here is what Ken had to say about the F-102.*

I was a member of Air Force Pilot Training Class 56-D which graduated on November 8, 1955. Prior to graduation we were given a choice of aircraft to fly in Advanced Training. The choices were the F-86D, F-89D, and F-94C. The F-89 Scorpion looked too big and complicated so I ruled that out. I thought that I would like to have someone in the back seat to operate the radar, so that eliminated the single-seat F-86D. That left the F-94C, and since it appeared to be the most obsolete of the three, I thought that maybe I could later fly the F-102 that we were hearing about.

After completing F-94C Advanced Training at Moody AFB, I was assigned to the 27th Fighter Interceptor Squadron at Griffiss AFB, New York. Upon reporting to the 27th, I was informed that the unit was the oldest fighter squadron in the Air Force, and that it had been Frank Luke's squadron in World War I. Being an aviation history nut, I promptly asked to see the squadron history and was told that there wasn't any such thing. Later, as squadron Historical Officer, I was able to rectify this situation.

After a year in the "94", we started to receive the F-102s in July 1957. My "Delta Pilot" card shows that I made my first solo flight in the Deuce on 12 August 1957. Checkout in the F-102A began with twenty hours in the simulator. This was the first simulator we had come in contact with. Although simulators were available for the F-86D and F-89D, they were not available for the F-94C. Next we received two dual rides in the TF-102A, and this was followed by a solo ride in the F-102A with an instructor close by in a chase plane.

During the first TF ride, a peculiarity of the delta wing was demonstrated. Power was reduced and level flight was maintained until the indicated air speed dropped to sixty knots which was as low as the gage would go. At this time vertical speed was 6000 feet per minute straight down, yet full control in pitch and bank was easily maintained. All you had to do was lower the nose, add power, and you flew out of it.

Although the TF-102A was supposed to be a combat trainer, ours never had the radar system, and they did not carry weapons. In fact, our two TFs had what appeared to be two wooden bar stool seats screwed into the instrument panel where the radar scopes should have been. As a result, the sun shield over the instrument panel sagged. The cure for this was to use a piece of bailing wire to tie the shield up to the magnetic compass. A pencil was wedged on each side between the shield and the frame

for the windshield to hold the sun shield tight. Modelers take note. We used the TFs for transition and instrument training and as targets. We generally referred to the TFs as "lead sleds" or just "sleds." One peculiarity of the TF was discovered when Gene Beliveau and I tried to do a barrel roll in one. No matter what we did we fell vertically out of the bottom of the roll.

During the first few months of operation we just tried to get the radar to work. Initially a "contact" or lock-on was cause for celebration. Part of our problem was maintenance, but primarily we had no idea how to make it work. There were no manuals or information of any kind. Some of the radar observers from our sister F-89 squadron, the 465th FIS, showed us how they thought it worked, and we took it from there. Since it looked like a television set we attempted to tune it like one. Our first pamphlet on the radar arrived about a year later. At first, the mode selector had two range selections, these being five miles and thirty miles. This was later changed to fifteen and thirty miles since five miles was too short a range for successful missile lock-on. The two other positions were "ground map" and "beacon." At that time I had a TV set which could only be made to work by jiggling the channel selector. When my radar quit one day, I eventually got it working by violently rotating the mode selector. By doing this I completed the mission. I reported this on the radar form after the mission, and I was told in no uncertain terms that what I had done was impossible, and that was the end of it. I later saved a mission during an Operational Readiness Inspection (ORI) with this trick. I don't think anyone else ever discovered this "boondock" maintenance.

Two types of attack were used at first. One was the ninety degree beam rocket attack, and the other was the ninety degree/twenty degree quartering stern attack for the GAR-1 and GAR-2 guided missiles. Later we added the 135 degree quartering head-on attack.

Our first information on max speed and altitude was found in the English magazine "RAF Flying Review." The day after reading this I climbed to 54,000 feet and went Mach 1.5 in a dive just like the magazine said. This was classified information, so it was not in our manuals!

We were each fitted with a partial pressure suit and helmets like the ones worn during the first sub-orbital space flights. Fortunately we never had to fly in them, since they were very uncomfortable.

Exceeding Mach 1 in the Deuce was perfectly smooth, and the only way you could know that you were passing the speed of sound was to look at the airspeed indicator/Mach meter. This was due to the efficient Automatic Flight Control System which damped out the "Dutch Roll" tendency of the delta wing. Without the AFCS operating, the max speed was about .85 Mach. While flying a mission with an inoperative AFCS, I discovered that the B-52s were faster than the Deuce. The AFCS also served as an autopilot that maintained altitude and heading or just altitude, whichever was selected. It also prevented any cross control maneuvering such as a slip or wing low crosswind landing unless it was turned off first. The AFCS was also connected to the radar, and once lock-on was achieved, releasing the radar hand control action switch allowed the aircraft to "fly the dot" to a Phase II fire, and then automatically disengage.

An interesting, and I thought stupid, change was made to the lock-on system for a short period. Squeezing the action switch on the radar hand control slaved the radar antenna to the hand control. Moving the hand control left and right caused the sweep or "jizzle band" to paint the target. Moving the hand control forward moved the range gate out to "spotlight" the target resulting in automatic lock on. Someone got the bright idea that we were actually moving the range gate up and down the scope rather than out to the target, so all aircraft were hooked up backwards. After we got used to this they changed it back! Some people hardly noticed the difference, but it drove me crazy.

As time went on we started to receive aircraft with the Case XX wing, then the TACAN. The Case XX wing had a better glide angle and a slight tendency to float on landing. The TACAN meant no flying in bad weather since we did not have a TACAN station in the vicinity. We sure missed the ADF in the F-94C.

Landing the Deuce was much easier than it looked. Vision over the nose on touchdown was about like that in an F-94 or T-33. A normal landing consisted of a final at about 170 knots with a touchdown around 140 knots. Our first flight manual said that the aircraft could be landed at ninety knots and that the aircraft had been landed at 80 knots. This must have resulted in some hard landings, because it was deleted in later editions of the manual. I made many landings down around ninety knots.

An early problem with the Deuce was a failure of the starter clutch to engage. When this happened, the starter, which was a small jet engine, would overspeed and explode. We did not have any problems with ours, but all aircraft were pulled out of line before starting to avoid damage to aircraft on either side in case the starter exploded. I once had an aircraft in which the starter refused to operate. The crew chief eventually got it started, and, after the mission, I asked him how he did it. "Oh, I just climbed on top of it and hit it with a hammer until it started." Now there was a brave man indeed!

The high pressure air tank in the left wing root occasionally broke at the connection. This turned it into a rocket pointing down. It would tear through the wing, hit the concrete, then bounce back into the wing. This was apparently caused by heat since we lost one at Tyndall AFB, Florida. There were already two there that had experienced the same problem.

Speed brakes had to be strengthened after several failures, and, until they could be strengthened, they were not to be deployed above 350 knots. We had one failure which I saw happen. Gene Beliveau and I were flying in one of our TF-102s when we spotted Carson Mason in an "F" and decided to "bounce" him. Just as Gene pressed the mike button and said, "Rat-a-tat-tat," Mason's speed

brakes broke off. We both instinctively reached for the armament switch in our unarmed TF-102 before we realized what had happened. At least we could prove that he was not exceeding 350 knots!

We had an afterburner restriction for a while due to failure of something called a "screech liner" in the tail pipe. This usually burned a hole in the side of the fuselage. Unfortunately, this was during the summer and before the runways were lengthened, so it made for some hairy take-offs.

The most serious problem during the early F-102 program happened when we sent the aircraft back for IRAN (Inspect and Repair As Necessary). Some aircraft came back with the primary and secondary hydraulic systems cross-connected. When one system started to fail, the aircraft became almost uncontrollable and eventually the controls locked. This happened to one of our people while he was turning on final. Unfortunately the ejection seat failed to function, and this resulted in the first fatality in the 27th FIS since 1952.

I had an aircraft with some sort of hydraulic problem that I discovered during the hydraulic check after start-up. Stirring the stick around the cockpit caused such a vibration that the crew chief and ladder were thrown off the plane. Witnesses swore that all three wheels were airborne at the same time. I found something else to fly!

For some reason we did not make formation landings in the F-94C, but after transitioning to the F-102, they were done as a matter of course. Formation flying and take offs were very easy with a tendency to fly too far back on the wing due to the wing's delta shape.

My flight commander, Bob Laney, could be depended upon to do something crazy every now and then. One day, while returning from a mission with Ray Ide on his left wing and me on his right, he decided we would make a three ship landing in fingertip formation from a 360 degree overhead pitch out. Ray and I both realized what he was up to and went along with it. We landed, dropped the drag chute, and taxied back to the squadron area, all in formation. Everyone thought it was very impressive except the base commander who happened to be watching. Bob got a real chewing out, primarily because we had not briefed it beforehand.

There was a rash of unexplained drag chute failures during our first summer. The maintenance folks finally realized that rain was leaking into the drag chute housing and soaking the chute. An hour at 40,000 feet resulted in the deployment of an ice cube on landing. Installing chutes just before flight eliminated the problem.

Due to the fact that the main landing gear was located so far aft on the F-102, the nose of the aircraft tended to swing away from the wind during a crosswind landing. This was because of the long fuselage and nose section forward of the main gear. Once the mains touched down, the wind would catch this forward section of the fuselage and nose and turn it in the direction that the wind was blowing. This was the opposite case from what happened on most other aircraft, particularly those with conventional gear. On those aircraft the vertical tail and the fuselage aft of the main gear was longer and larger, and the wind would catch this and push the aft section of the plane in the direction of the wind like a weather vane. This caused the nose section to move toward the wind. Deploying the drag chute on the Deuce would help cancel out the nose swing, however, during one severe crosswing landing, I almost went off the runway backwards.

If we used the drag chute at a non-ADC base, we had to repack it ourselves. I popped mine without thinking at Plattsburg AFB and had to return home to a 10,000 foot, ice covered runway knowing the chute I had packed was not going to function. Sure enough, I slid 10,000 feet until I finally hit a bare spot about fifty feet from the barrier. Locked brakes and a full left nose wheel got me out of a most embarrassing situation.

Because of the distance between the nose gear and the main gear, F-102s could not engage a barrier successfully. In a barrier engagement, the nose gear on most aircraft would run over the cable and catch a net that would cause the cable to flip up into the air. The main gear would then catch the cable before it fell back to the ground. On the F-102, the main gear was so far aft of the nose gear that by the time the main gear got to the cable it had already fallen back to the ground and the main gear simply rolled over it. The first successful engagement took place at Griffiss by an aircraft belonging to the Research and Development Command. In order to get the main gear into the cable before it fell back to the ground, the pilot hit the barrier at 105 knots. This high speed engagement broke the main spar in the wing. Later all F-102s were fitted with a barrier probe under the fuselage which deployed when the drag chute handle was pulled. This was known locally as the "dog pecker."

With the F-102 we finally had a bird that could fly and fight above 40,000 feet. We no longer had to request SAC to descend to our altitude so that we could make a pass, and we could turn inside of anything in the air. However, lack of overhead visibility made dogfighting difficult, if not impossible. We would have given anything for a gun and a clear vision canopy like the one later fitted to the F-106A. Unfortunately, the Air Force was in its rocket and missile period, and it took a war to show them that they were wrong.

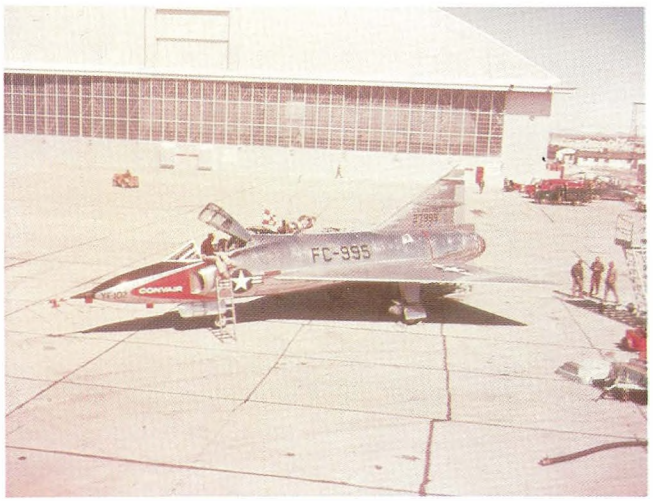
Later, as a GCI controller, I worked Deuces at Thule AFB, Greenland. It was amazing to see the improvement in radar and tactics that has been made since I had flown the aircraft. Their contact and lock-on range was greater than we were able to achieve even down in Florida.

The 27th FIS lost their Deuces in the fall of 1959, moved to Loring AFB, Maine, and eventually received the F-106.

Kenneth R. Lundquist
1/LT USAF
Squadron Historical Officer
27th Fighter Interceptor Squadron
Griffiss AFB, New York
1956-1959

# DEVELOPMENTAL AIRCRAFT IN COLOR

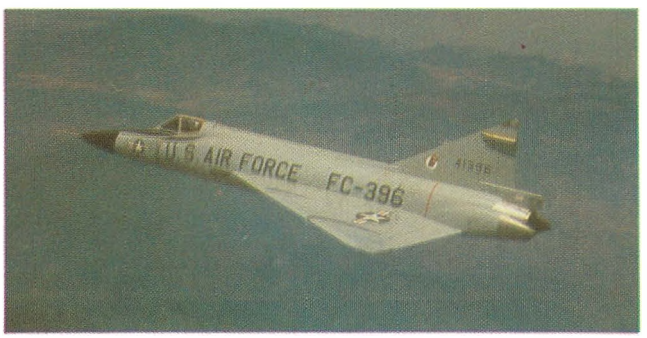
*Above left and right: These two rare color photographs show the diminutive XF-92 both before and after installation of the afterburner, and before the aircraft was painted white. At left is the XF-92 configuration without the afterburner, and at right is the XF-92A configuration with the afterburner added to the tail section of the fuselage. Note the* ***XF-92A*** *painted in black on the nose.*
*(Both NASM via Piet)*



*This is the second YF-102 shortly after it was rolled out from the factory.* *(USAF)*

*This close-up of the nose of the second YF-102 shows the markings in better detail.* *(USAF)*

*Colors of the first YF-102A are revealed here.* *(USAF)*



*An early short-tailed F-102A is shown here in ADC gray. The aircraft belongs to the 327th FIS at George AFB, California. This was the first unit to operate the Delta Dagger.* *(USAF)*

# ACTIVE AIR FORCE F-102s

*These two F-102s were assigned to the 317th FIS and the Alaskan Air Command.* *(USAF)*

*The 57th FIS was the last active Air Force unit to operate the Delta Dagger. This photograph shows one of their aircraft in an unusual silver lacquer paint scheme.* *(USAF)*

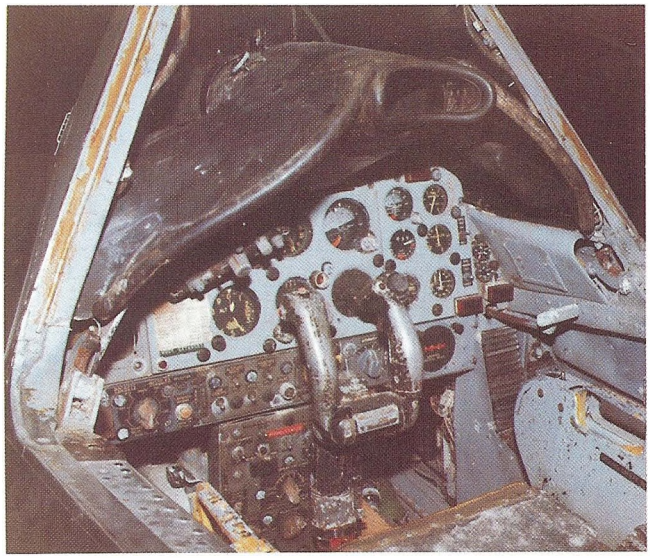
*The more common scheme and markings for the 57th FIS are shown in this photograph taken at William Tell 1972. Note the lack of an IR sensor on this aircraft even at this late date in the life of the Deuce.* *(Munkasy)*

*A few F-102s were assigned to the Air Defense Weapons Center at Tyndall AFB, Florida.* *(USAF)*

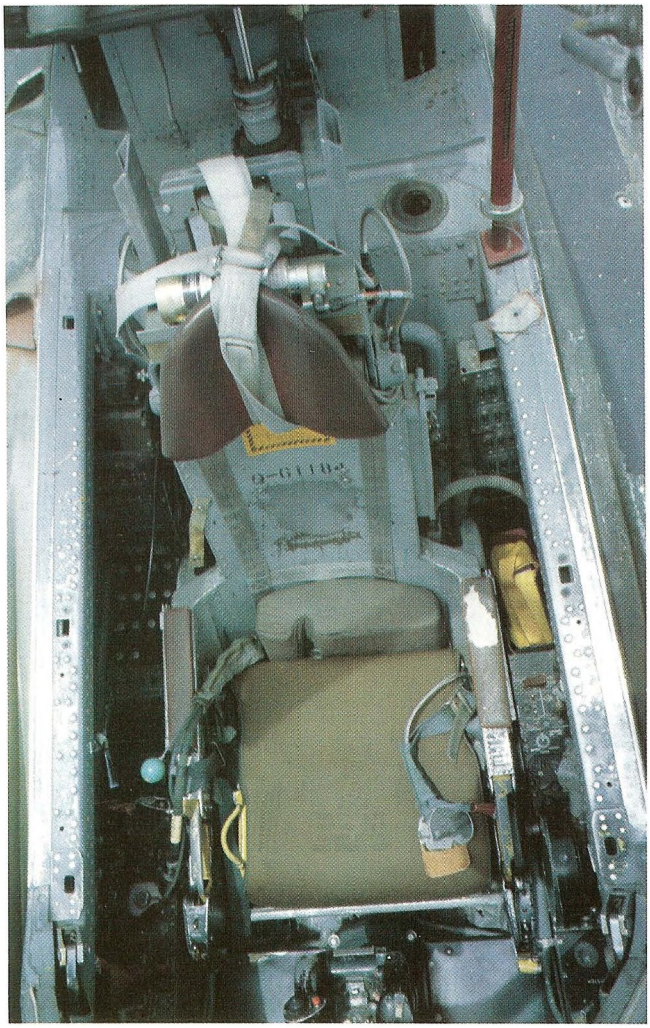
*F-102s stationed in Vietnam, and later some that flew in Guard units, were painted in the SEA camouflage scheme. This aircraft was assigned to the 509th FIS.* *(USAF)*

*Left and right side views show the markings that were applied to this F-102A that was flown by NASA.*
*(Flightleader collection)*

# COCKPIT DETAILS

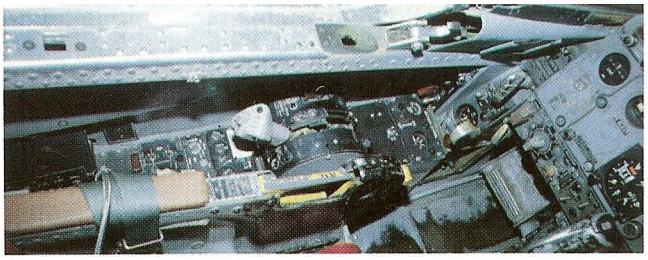


*Although it has deteriorated to some degree, the cockpit of the F-102A at the U.S. Air Force Museum is still in pretty good shape despite being on display for many years. This photograph is valuable since it provides a look at the cockpit colors and the hooded radar scope.*
*(Leader)*

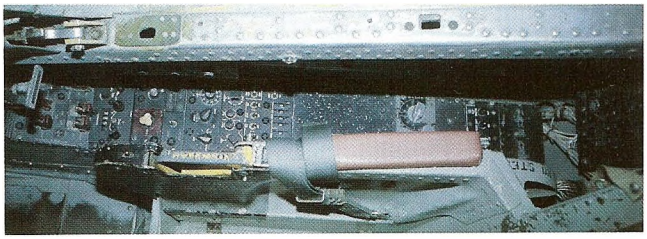


*Ejection seat colors are shown here.*

*This is the cockpit in the man-rated MPQM-102B drone, and the colors shown here and in the photographs below are typical of those used in standard Delta Daggers. These photos are being used since quality color photographs of F-102 cockpits, taken while the aircraft was still in operational service, could not be located. The major difference between this cockpit and that in the fighter is the removal of the radar scope which is replaced with a drone-related panel of switches and buttons.*

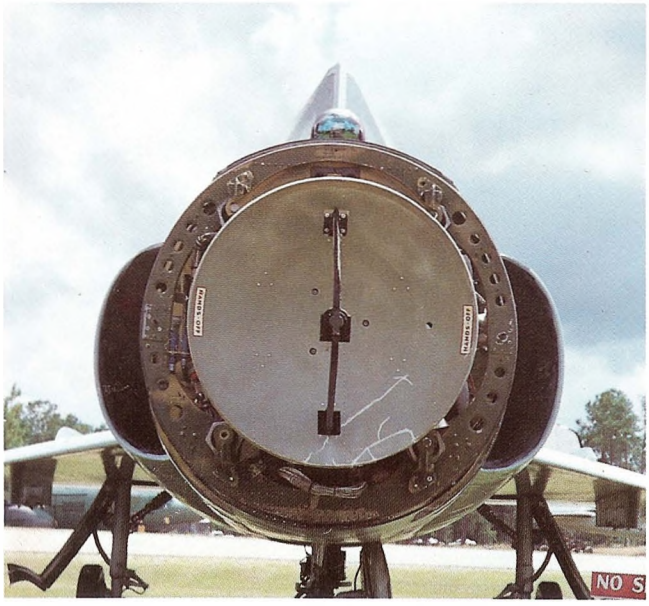


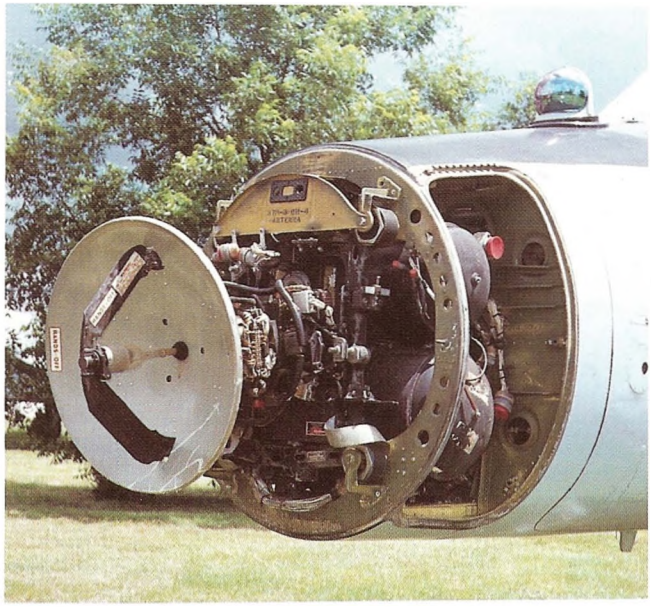
*This is the left console showing details of the throttle.*



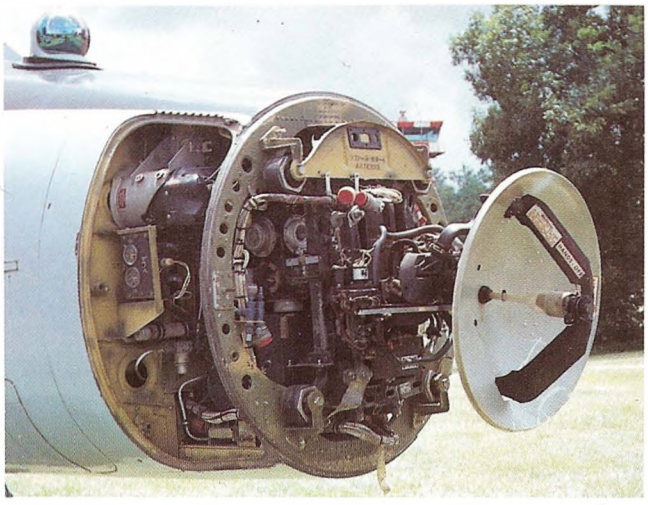
*Features of the right console are revealed here.*

# RADAR & FIRE CONTROL SYSTEM

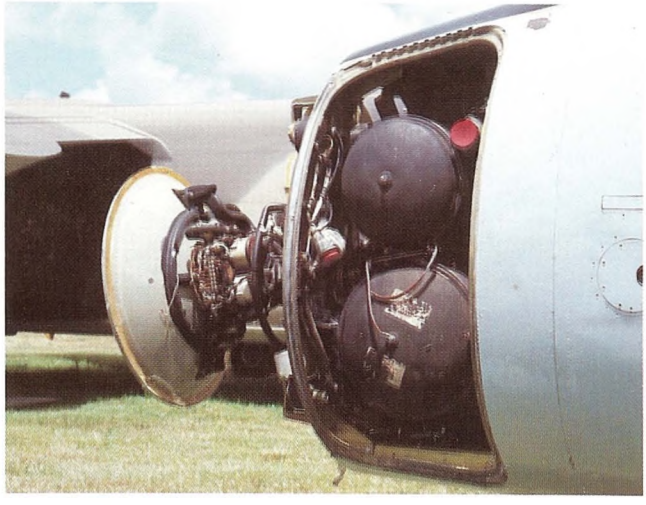




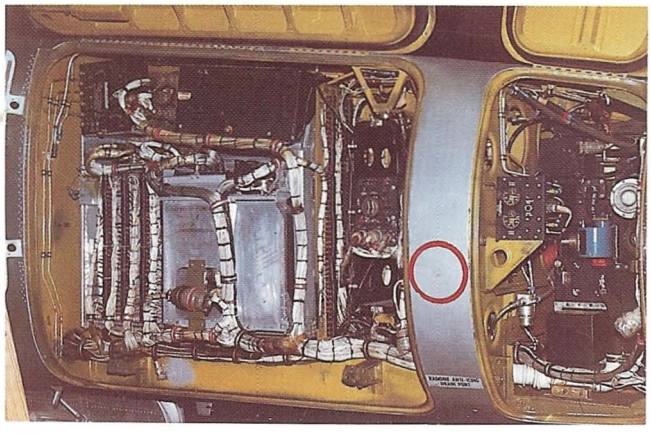
*After an exhaustive search failed to turn up color photographs of the radar antenna and fire control system in the F-102, trips were made to two museums in hopes of obtaining such photographs. The results of these trips are shown on this page. This is the radar in the F-102A which is on display at the excellent Museum of Aviation at Robins Air Force Base, Georgia. The radar had not seen the light of day since 1971 when the aircraft was retired at Tyndall AFB.*

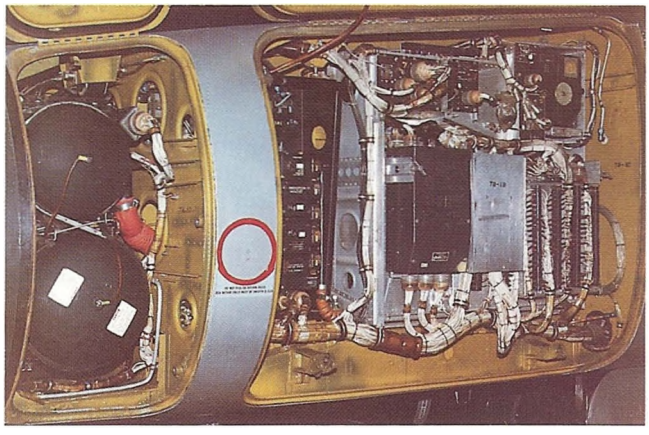


*This is a right front view showing the radar and its associated equipment.*



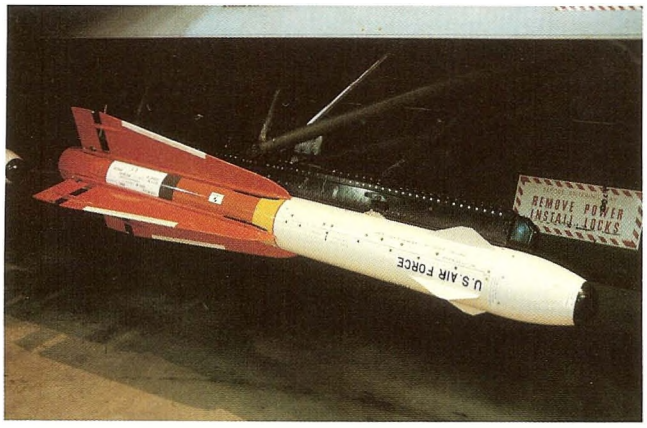
*This angle reveals the back of the antenna as seen from the left.*

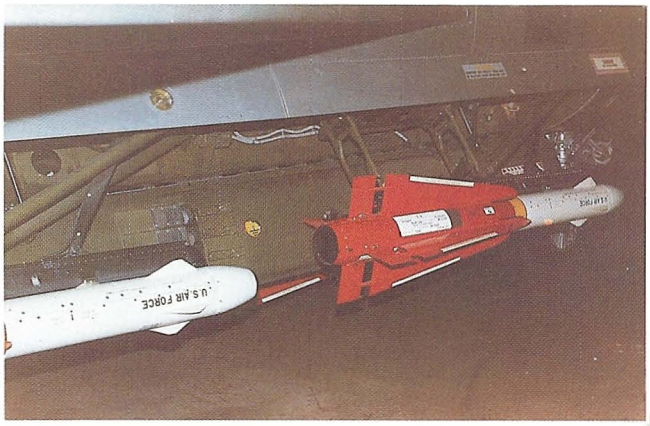




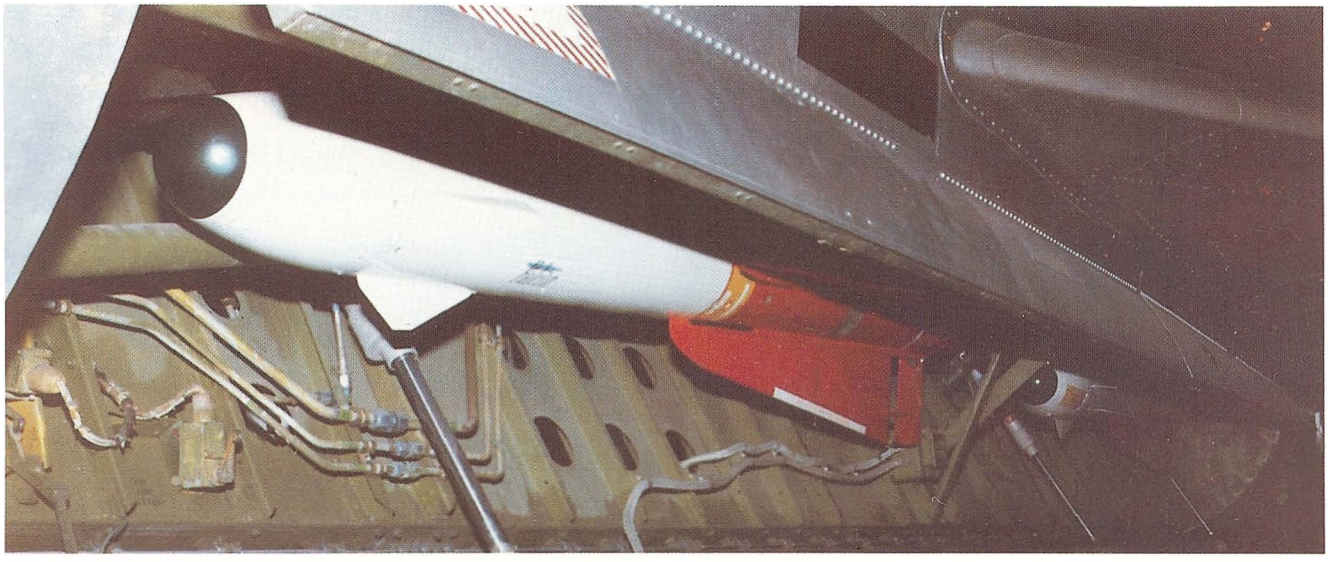
*These two photographs were taken at the U.S. Air Force Museum at Dayton, Ohio. With the four large panels in the nose section opened, components of the fire control system are visible.* *(Leader)*

# FALCON MISSILE ARMAMENT

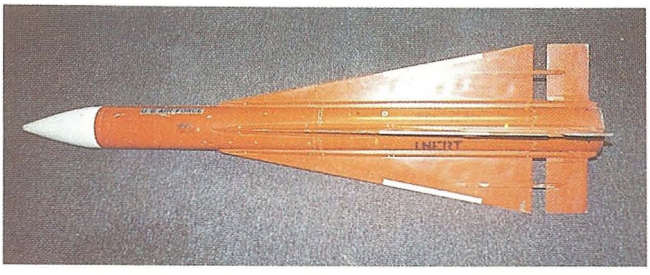


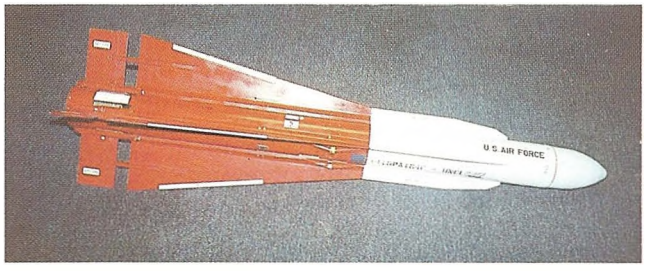

*These two photographs show Falcon missiles extended on their rails from the right side weapons bay on an F-102A. The white areas on the missile's wings are the fuses that detonate the warhead. The missile had to score a direct hit of one of these fuses on the target to be effective.* *(Left Leader, right author)*



*In this view, the Falcons are in the retracted position inside the left missile bay.* *(Leader)*

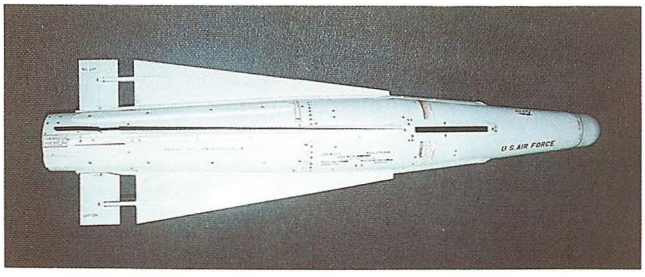


*This is the AIM-4E version of the Falcon. It was semi-active radar guided.*




*The AIM-4F was a later radar guided version of the Falcon.*

*The AIM-4G was the IR guided follow-on to the earlier AIM-4C and AIM-4D.*




*The AIM-26 Super Falcon was capable of carrying both nuclear and conventional warheads.*

# AIR NATIONAL GUARD DEUCES

*Twenty Air National Guard units in eighteen different states flew the Deuce for many years to protect America's skies. At left is an F-102A in an unusual overall silver lacquer scheme from the Idaho ANG. At right is an F-102A from the Flying Yankees of the Connecticut Air Guard.* *(Both Flightleader collection)*

*Dated August 6, 1972, the photograph at left shows markings used by the Wisconsin Air National Guard's 176th FIS. Pennsylvania's 146th FIS is illustrated at right.* *(Both Flightleader collection)*

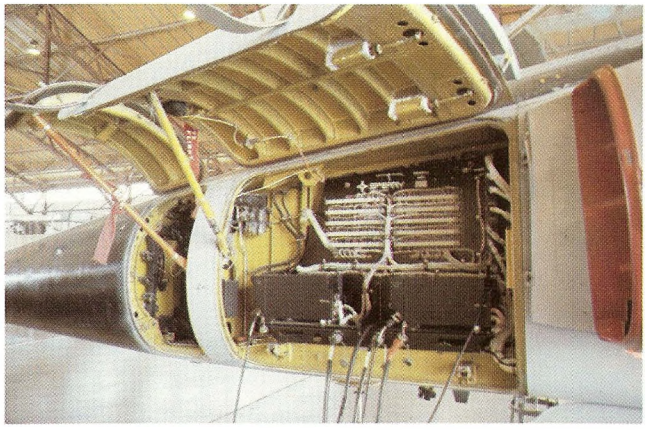
*TF-102As also served with the Guard units as evidenced by these two photos. The aircraft at left is from the 186th FIS of the Montana Air National Guard, while the one at right is a TF-102A from California's 196th FIS.*
*(Left Geer via Flightleader, right Brewer via Flightleader)*

*Some camouflaged Deuces found their way into Guard units. The one at left belongs to Idaho's 190th FIS, and sports a sharksmouth that was unusual if not unique for an F-102. It is painted in the standard SEA camouflage. The Florida ANG aircraft shown at right is unusual in that only one shade of green has been used instead of the usual two. It was photographed at Tyndall AFB on September 25, 1972.* *(Left Flightleader, right Munkasy)*

# DRONES

*F-102A, 56-1263, pictured on the previous page with its sharksmouth and the camouflaged markings of the Idaho Air National Guard, wound up as a drone in the Pave Deuce program at Holloman AFB, New Mexico. The usual case for drones was to have red tails and wing tips painted over their old squadron markings as shown here.*

*This drone was completely repainted in an overall white scheme with red trim. It was the show plane for the Pave Deuce program for years, and is on display here next to the Army's only A-3 Skywarrior.*



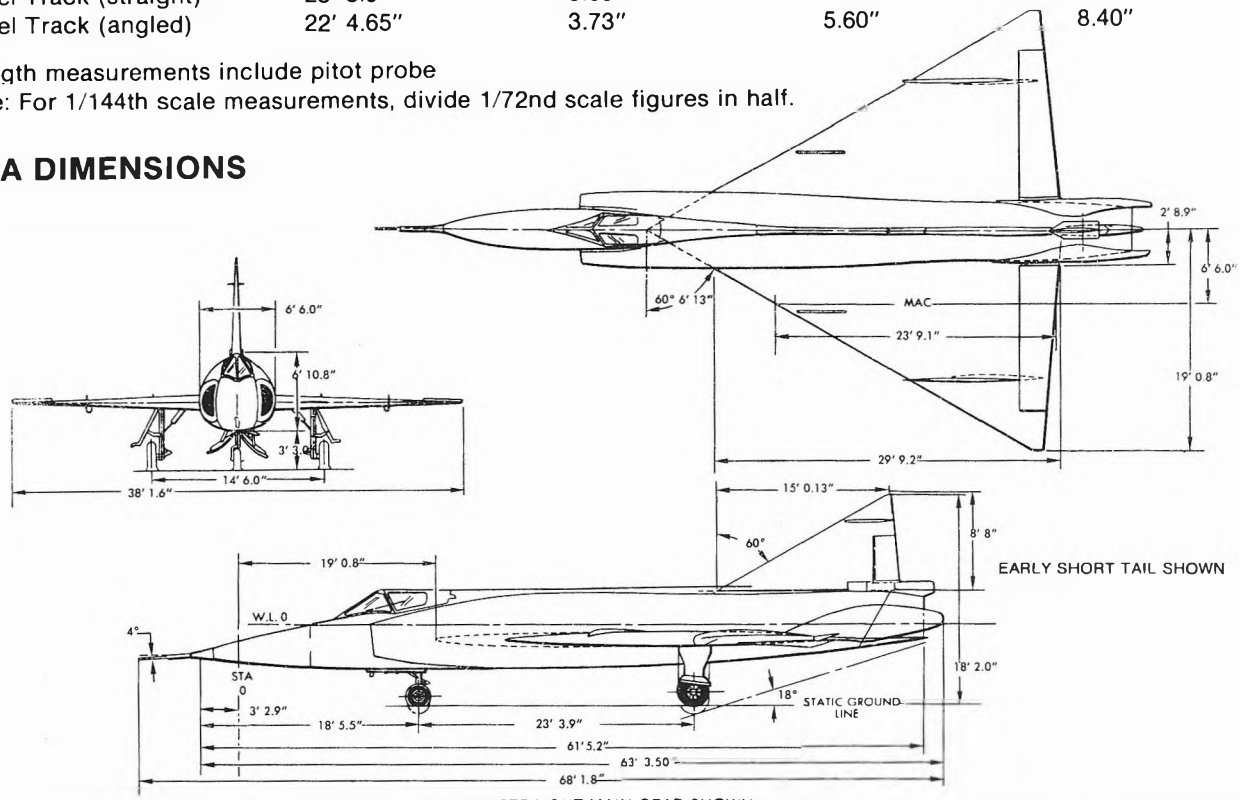
*These two photographs show some of the drone-associated equipment that replaced the fire control equipment in the nose of the PQM-102B.*

# DIMENSIONS

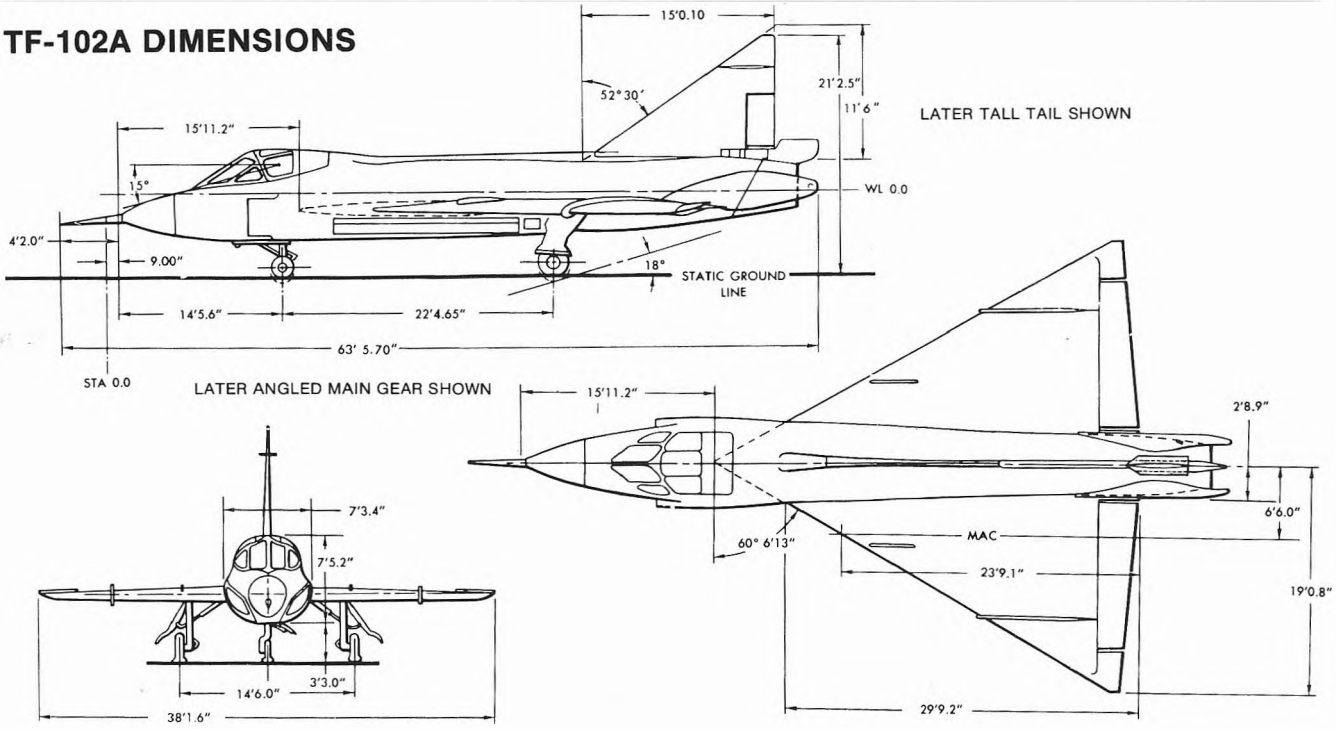
| MEASUREMENT | ACTUAL | 1/72nd SCALE | 1/48th SCALE | 1/32nd SCALE |
|---|---|---|---|---|
| Wingspan | 38' 1.6" | 6.36" | 9.53" | 14.30" |
| Length (F-102A)* | 68' 1.8" | 11.36" | 17.04" | 25.56" |
| Length (TF-102A)* | 63' 5.7" | 10.58" | 15.87" | 23.80" |
| Height (tall tail) | 21' 2.5" | 3.53" | 5.30" | 7.95" |
| Height (short tail) | 18' 2.0" | 3.03" | 4.54" | 6.81" |
| Wheel Tread | 14' 6.0" | 2.42" | 3.63" | 5.44" |
| Wheel Track (straight) | 23' 3.9" | 3.89" | 5.83" | 8.75" |
| Wheel Track (angled) | 22' 4.65" | 3.73" | 5.60" | 8.40" |

*Length measurements include pitot probe
Note: For 1/144th scale measurements, divide 1/72nd scale figures in half.

## F-102A DIMENSIONS

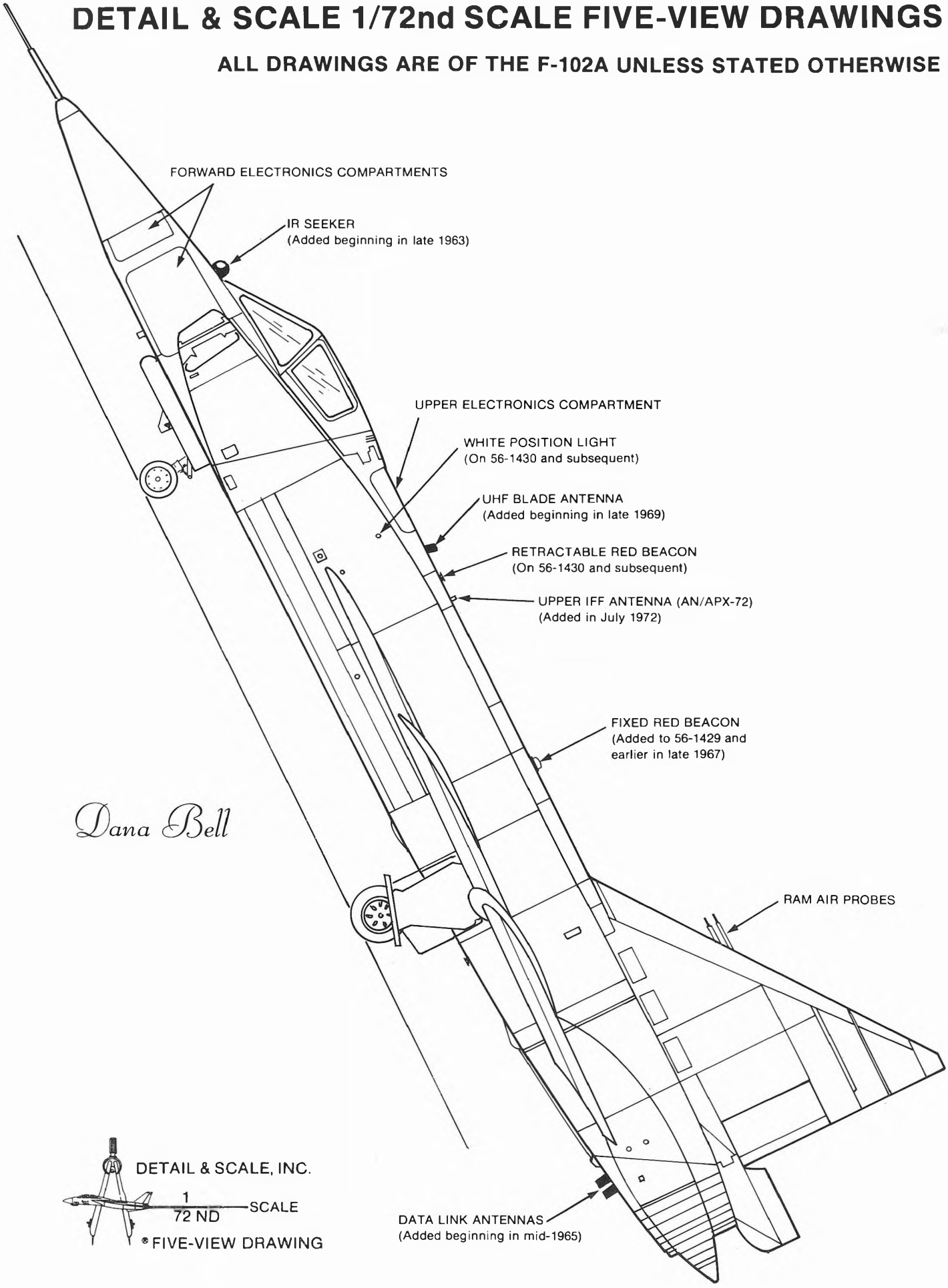



## TF-102A DIMENSIONS



# DETAIL & SCALE 1/72nd SCALE FIVE-VIEW DRAWINGS

## ALL DRAWINGS ARE OF THE F-102A UNLESS STATED OTHERWISE

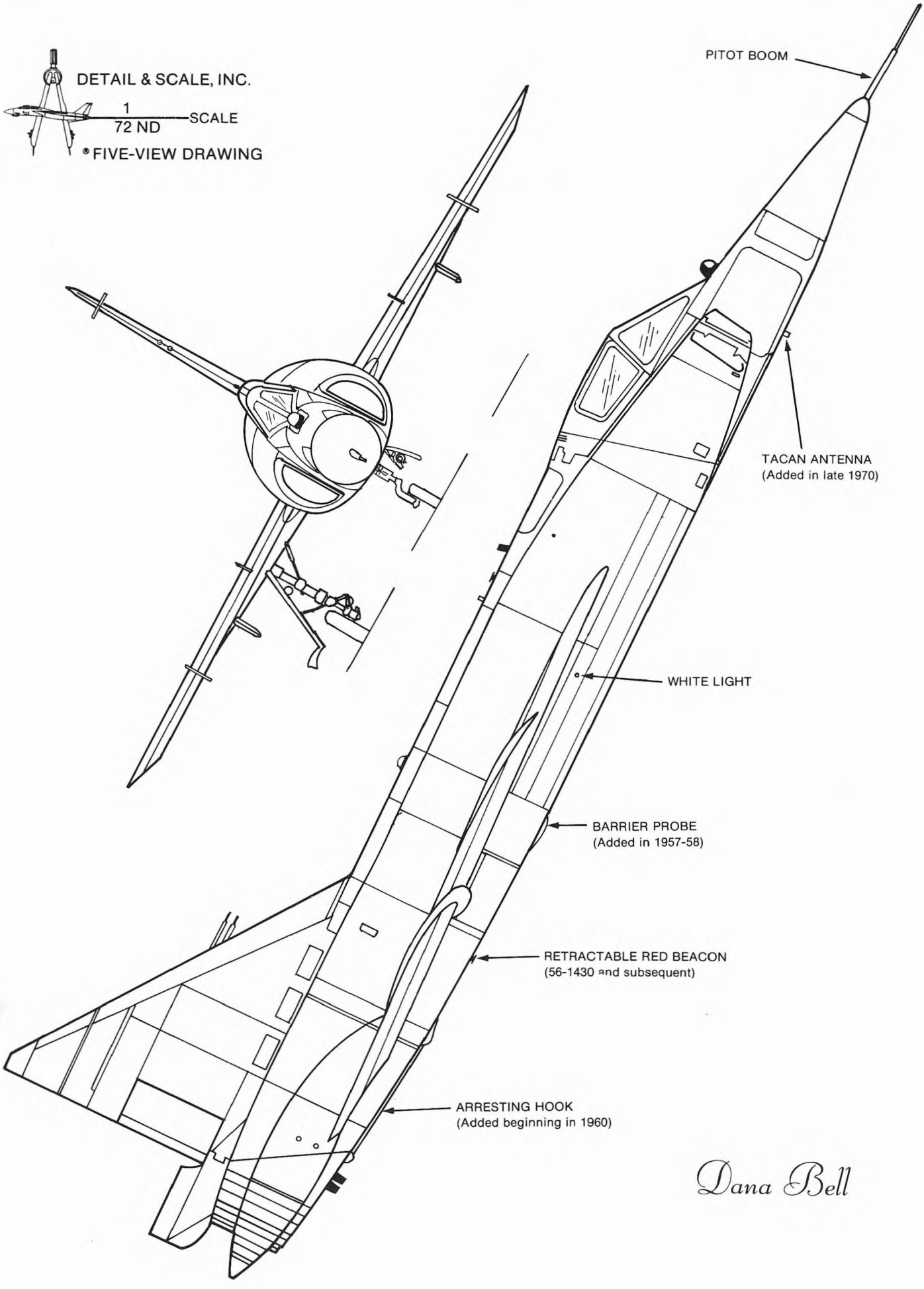


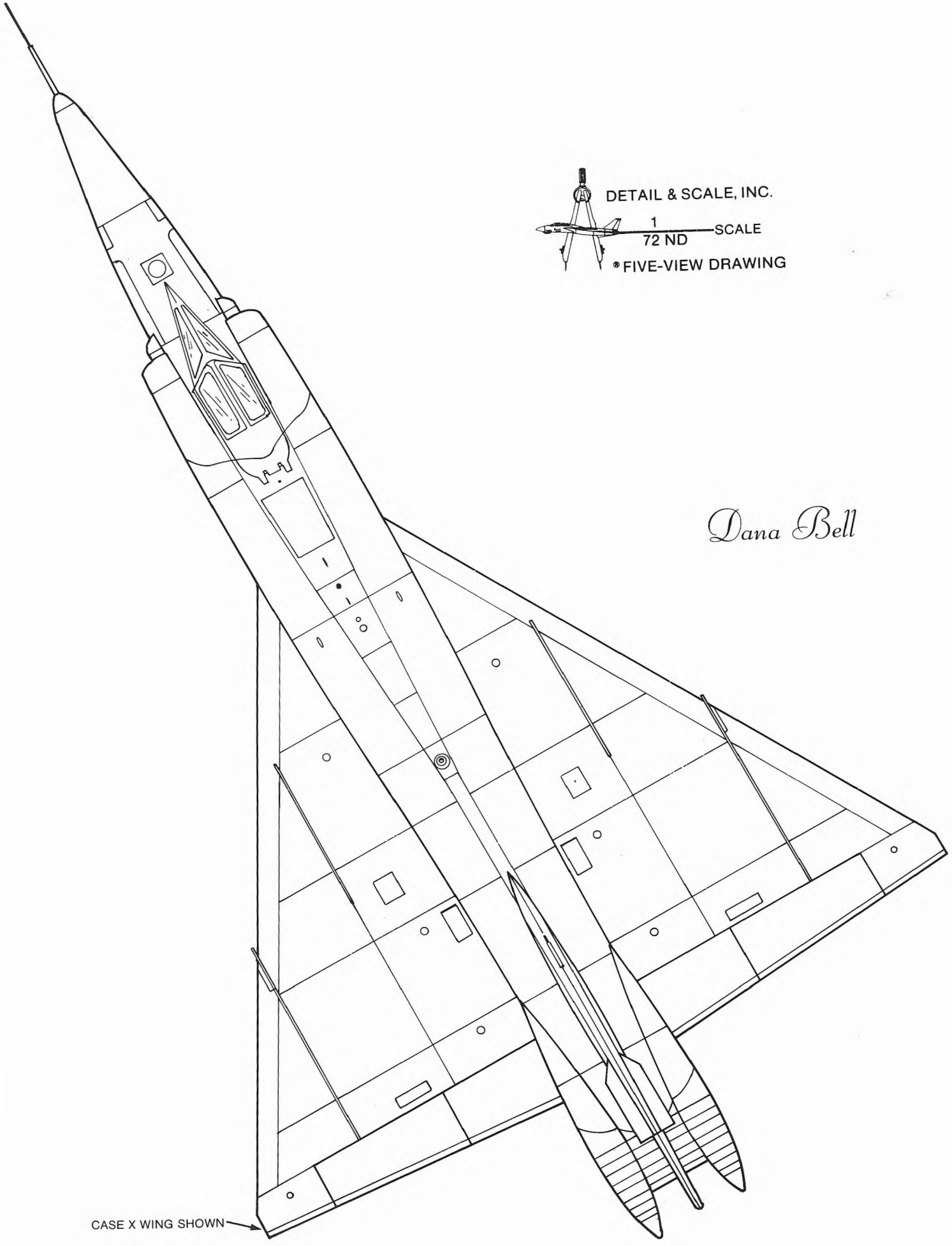

*Dana Bell*

DETAIL & SCALE, INC.

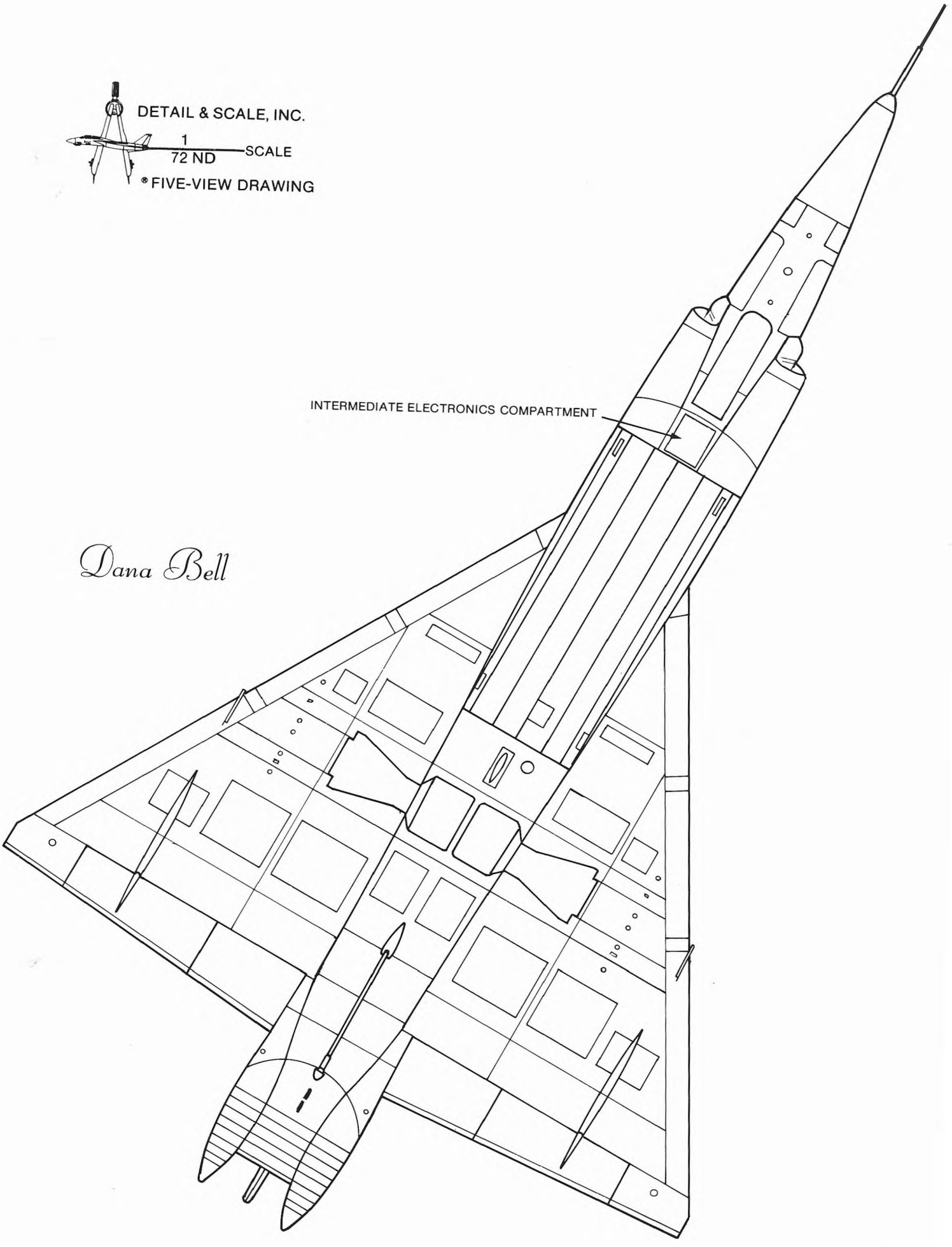
1/72 ND SCALE

® FIVE-VIEW DRAWING


DETAIL & SCALE, INC.
1
72 ND
SCALE
® FIVE-VIEW DRAWING
PITOT BOOM
TACAN ANTENNA
(Added in late 1970)
WHITE LIGHT
BARRIER PROBE
(Added in 1957-58)
RETRACTABLE RED BEACON
(56-1430 and subsequent)
ARRESTING HOOK
(Added beginning in 1960)
Dana Bell

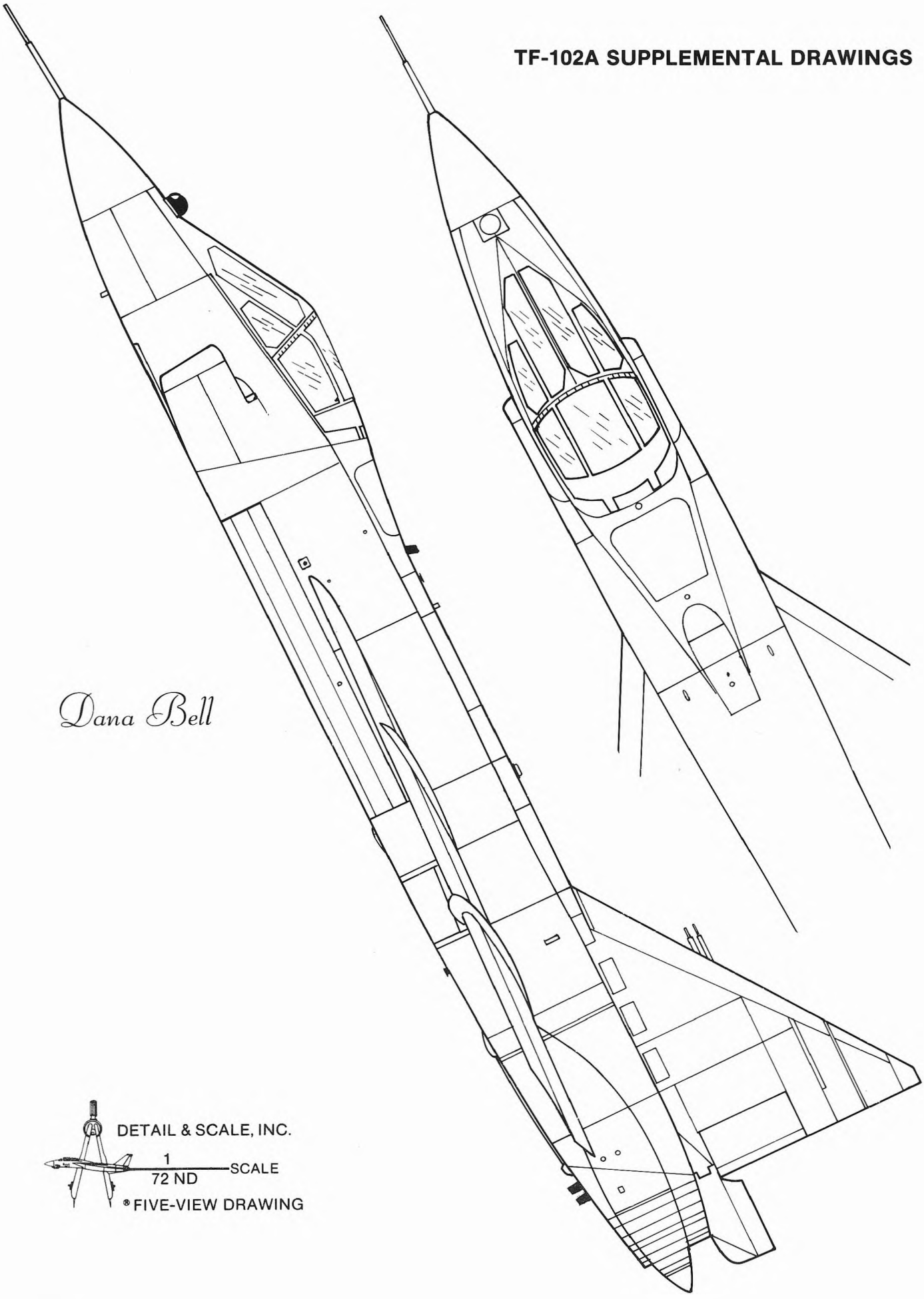

DETAIL & SCALE, INC.
1
72 ND
SCALE
® FIVE-VIEW DRAWING
Dana Bell
CASE X WING SHOWN

DETAIL & SCALE, INC.
1
72 ND
SCALE
® FIVE-VIEW DRAWING


INTERMEDIATE ELECTRONICS COMPARTMENT

*Dana Bell*

# TF-102A SUPPLEMENTAL DRAWINGS

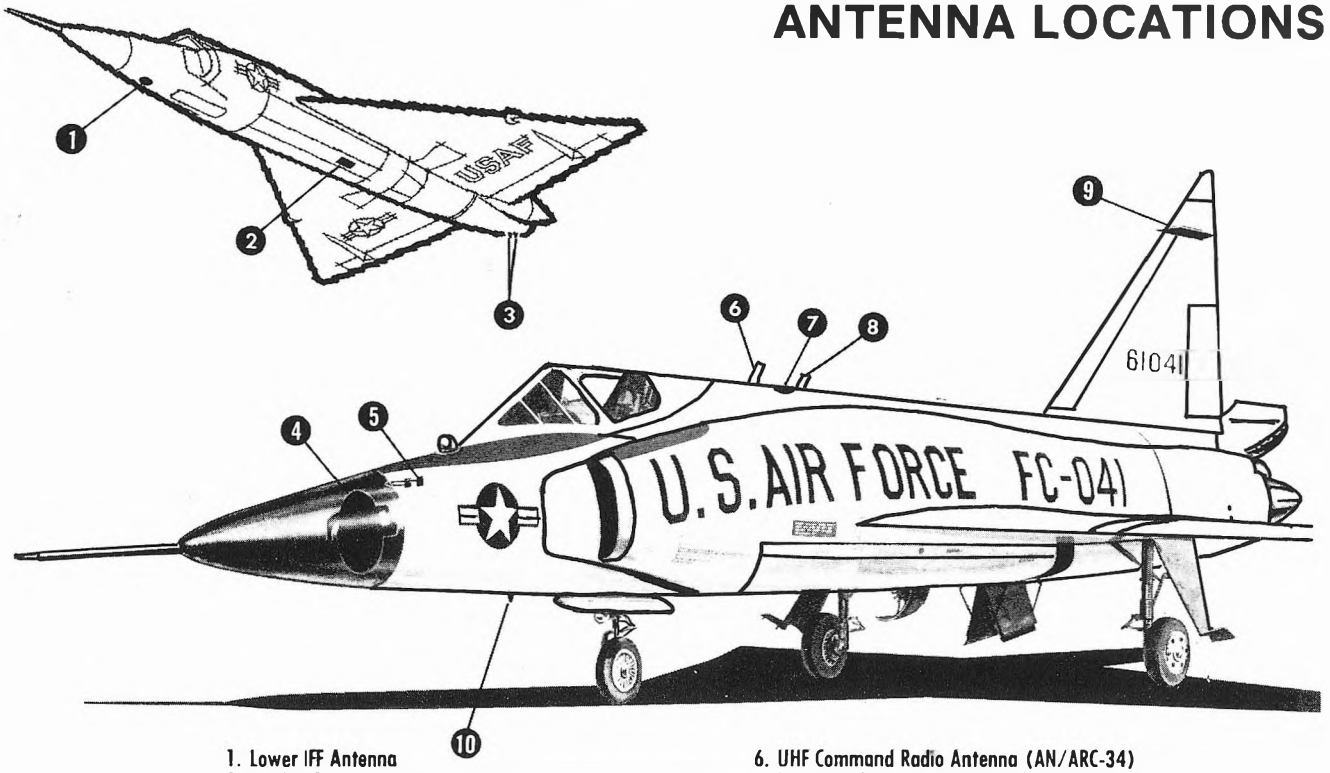


*Dana Bell*

DETAIL & SCALE, INC.
1/72 ND SCALE
® FIVE-VIEW DRAWING

# DELTA DAGGER DETAILS

## ANTENNA LOCATIONS

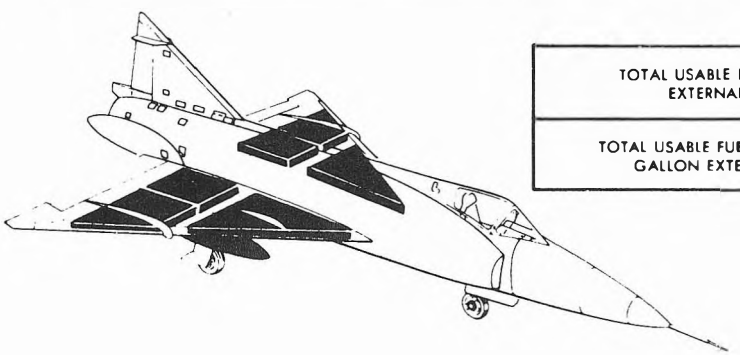



1. Lower IFF Antenna
2. Marker Beacon Antenna (AN/ARN-12 or AN/ARN-32)
3. Data Link Antenna
4. Radar Antenna (MG-10)
5. Glide Slope Antenna (AN/ARN-31)
6. UHF Command Radio Antenna (AN/ARC-34)
7. Upper IFF Antenna (AN/APX-6A or AN/APX-25)
8. Upper IFF Antenna (AN/APX-72)
9. VHF Antenna Localizer of AN/ARN-31
10. Tacan Antenna (AN/ARN-21)

*Typical antenna locations are illustrated in this drawing.* *(USAF)*

## FUEL TANK LOCATIONS

| TANKS | NUMBER | USABLE FUEL | | FULLY SERVICED | |
|---|---|---|---|---|---|
| | | POUNDS | GALLONS | POUNDS | GALLONS |
| RIGHT WING | TANK NO. 1 | 920.0 | 141.5 | 939.5 | 144.5 |
| | TANK NO. 2 | 1631.5 | 251.0 | 1651.0 | 254.0 |
| | TANK NO. 3 | 975.0 | 150.0 | 988.0 | 152.0 |
| LEFT WING | TANK NO. 1 | 920.0 | 141.5 | 939.5 | 144.5 |
| | TANK NO. 2 | 1631.5 | 251.0 | 1651.0 | 254.0 |
| | TANK NO. 3 | 975.0 | 150.0 | 988.0 | 152.0 |
| EXTERNAL TANKS | LEFT HAND | *1397.5 | *215.0 | *1417.0 | *218.0 |
| | RIGHT HAND | *1397.5 | *215.0 | *1417.0 | *218.0 |

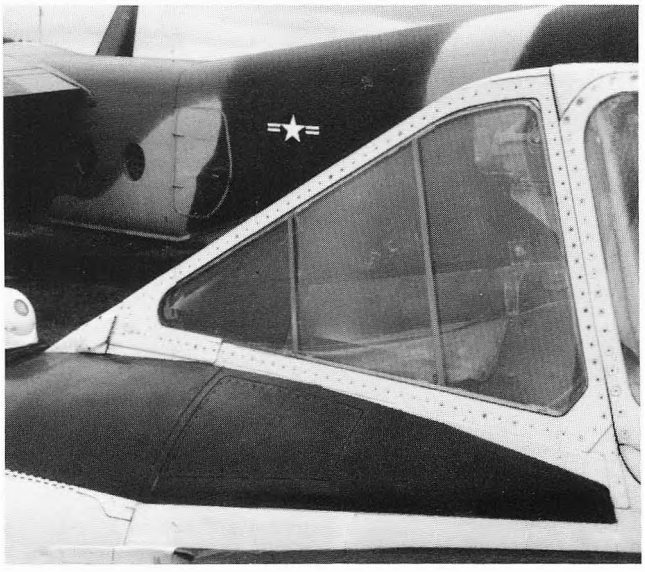


| | POUNDS | GALLONS |
|---|---|---|
| TOTAL USABLE FUEL WITHOUT EXTERNAL TANKS | 7053.0 | 1085.0 |
| TOTAL USABLE FUEL WITH TWO 230 GALLON EXTERNAL TANKS | *9848.0 | *1515.0 |

*Fuel quantity data for the F-102A is furnished in this table. The data was the same for the TF-102A.* *(USAF)*

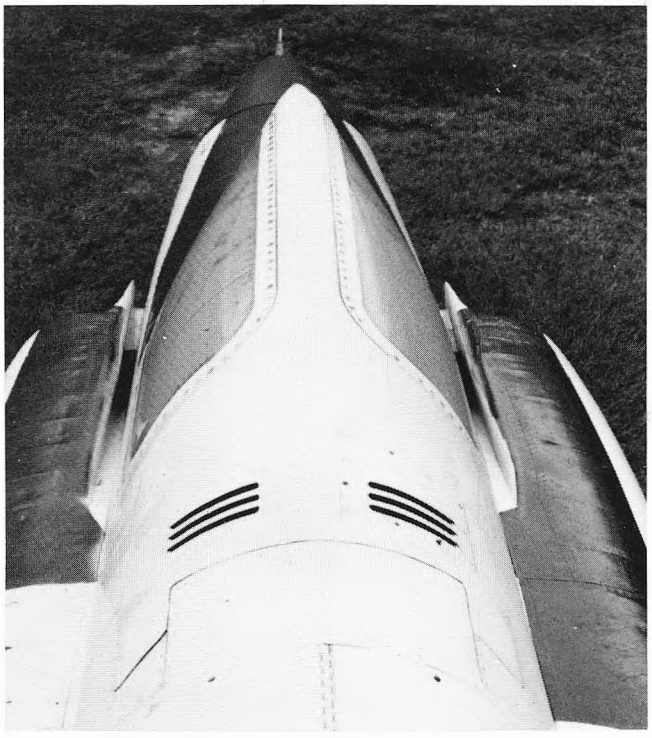
# SINGLE-SEAT CANOPY

*This head-on view of the windscreen and canopy reveals how the canopy is slightly bulged or bubbled.*

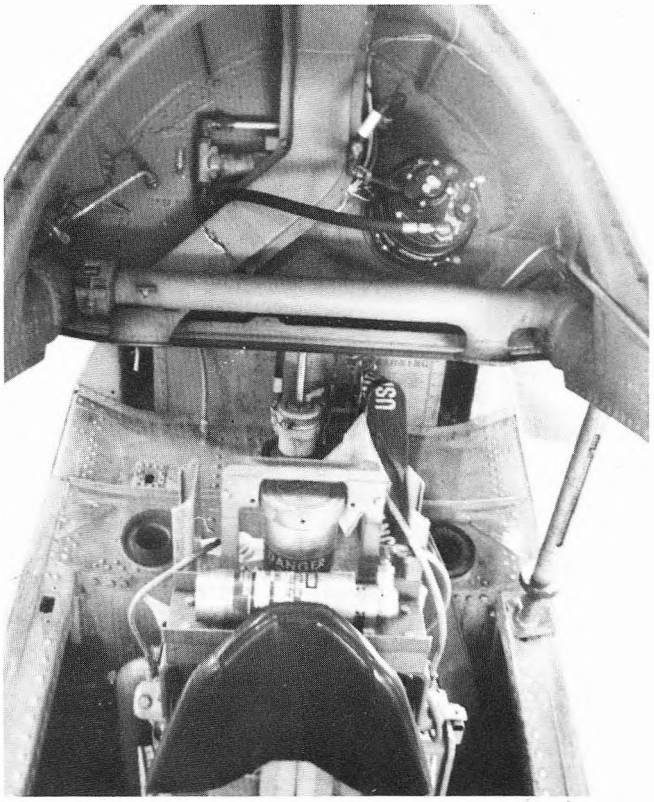


*This left side view of the windscreen shows the electrical heating strips in the glass.*

*Hinge detail is visible on this open canopy.*

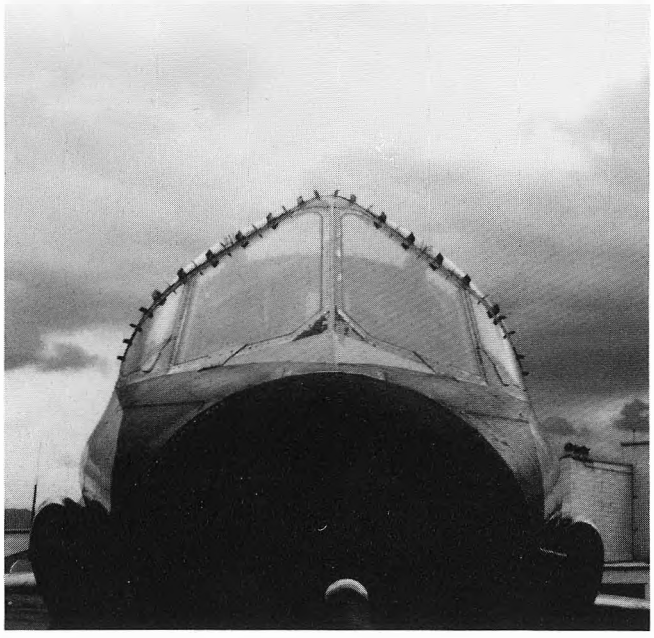


*Here is the closed canopy as viewed from behind.*



*This unusual shot was taken looking back into an open canopy. The cylinder that raises and lowers the canopy can be seen in the center of the photo. A removable brace is holding the canopy open while maintenance is being performed, and can be seen between the canopy and the cockpit side to the right in the photo. The interior of the canopy was painted the same gray as the rest of the cockpit.*

# TWO-SEAT CANOPY



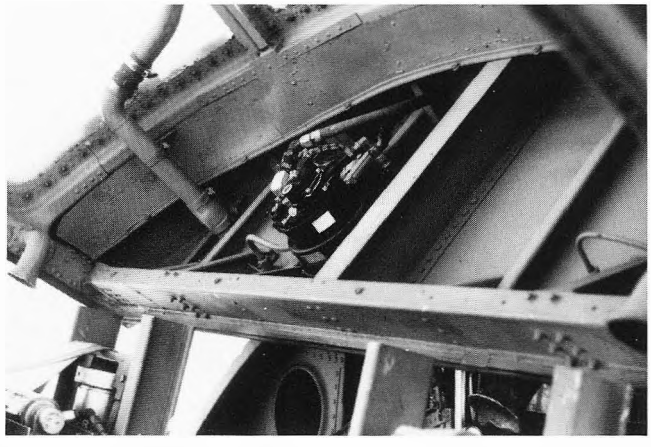
*The numerous vortex generators attached to the forward framing of the large TF-102A canopy can be seen in this view. Other vortex generators are located further aft as seen in the photographs below.*

*The framing for the wide windscreen can be seen here. This aircraft has the IR sensor located in front of the windscreen, while the aircraft in the photograph at left does not.*

*This right side view provides a better look at the vortex generators on this side of the canopy.*

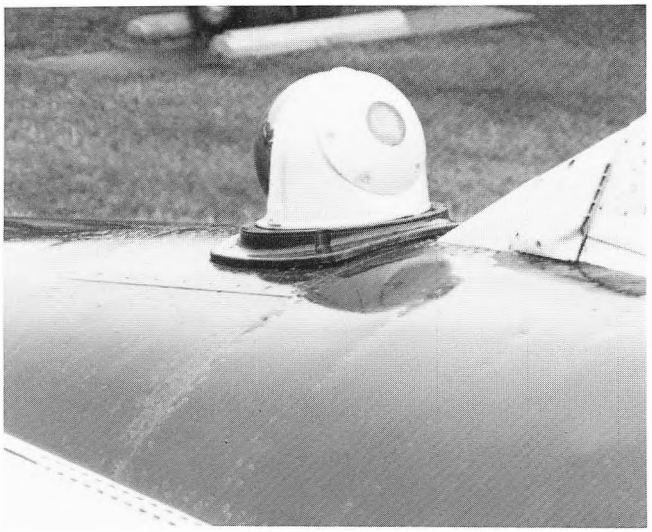
*Taken from the left side, this photo shows more details of the canopy and windscreen. "La Tina" was the last operational TF-102A.*

*The area under the windscreen is revealed here. Note the compass at the top of the framing. (Mills)*



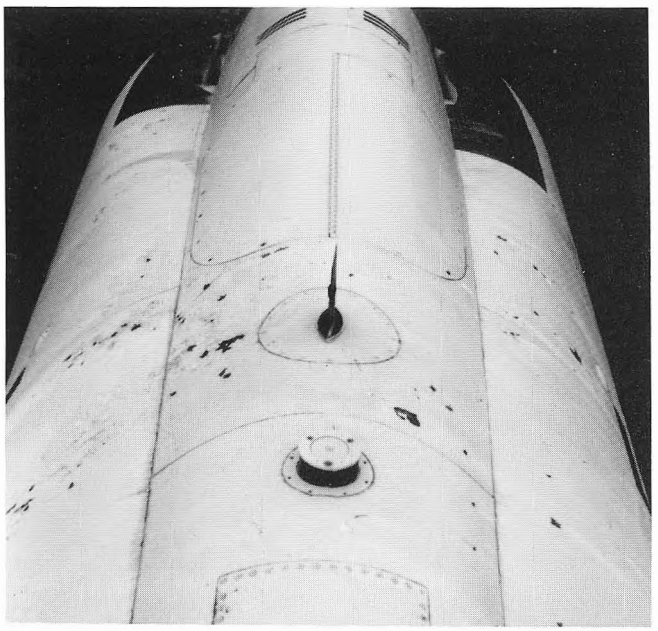
*The aft end of the inside of the canopy is shown here. (Mills)*

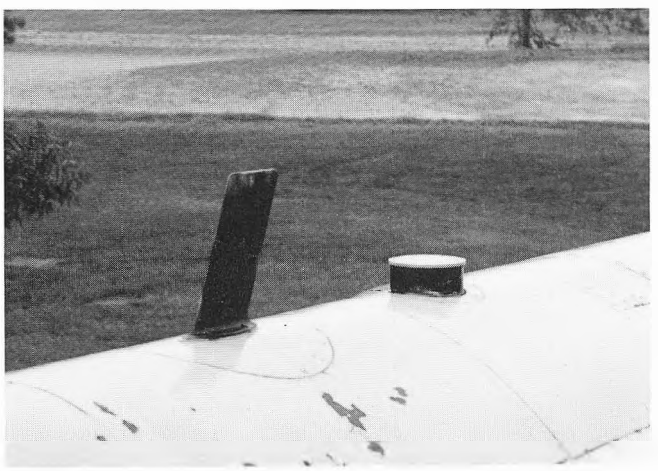
# FUSELAGE DETAILS



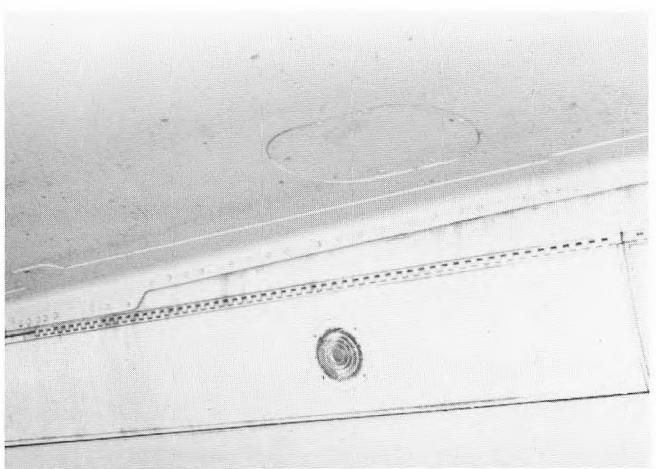
*The IR sensor and its mount are seen from behind in this view.*

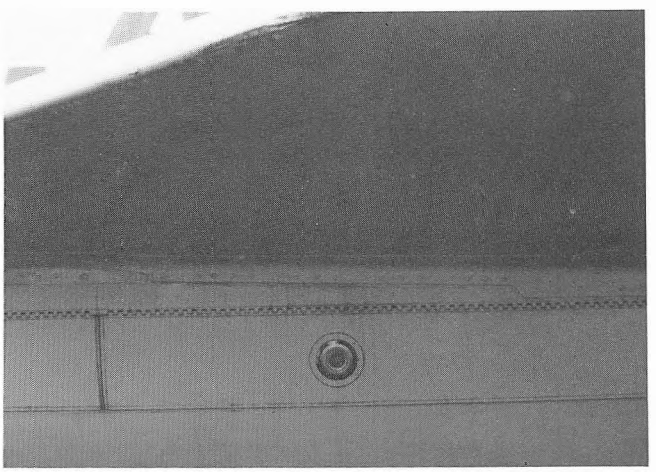
*This view shows the final design for the intake with the ramp or plate in front of it. Also note the angle-of-attack transducer and the static port just in front of the armament rectangle. (Munkasy)*



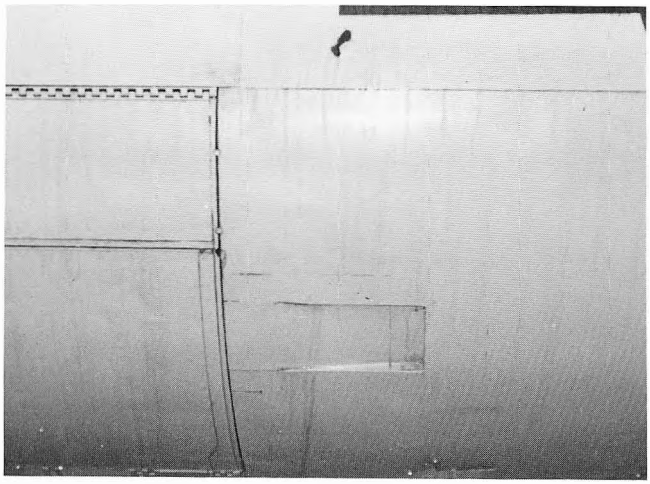


*These two photographs show the black blade UHF Command Radio Antenna (AN/ARC-34) and the upper beacon on the spine of the aircraft. They are located just behind the upper electronics compartment.*

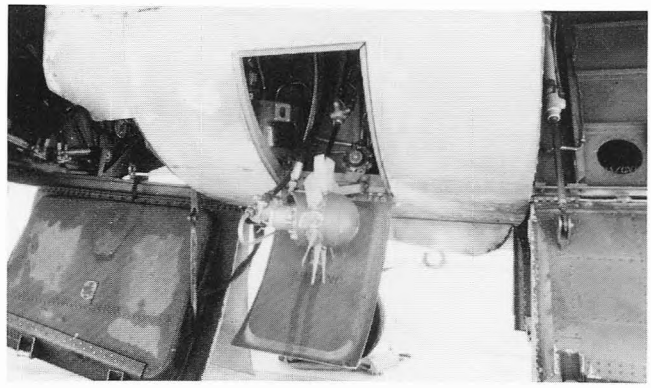




*Position lights are located on the upper weapons bay doors on each side.*

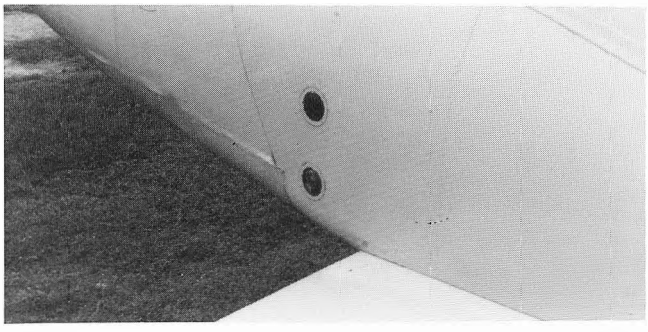


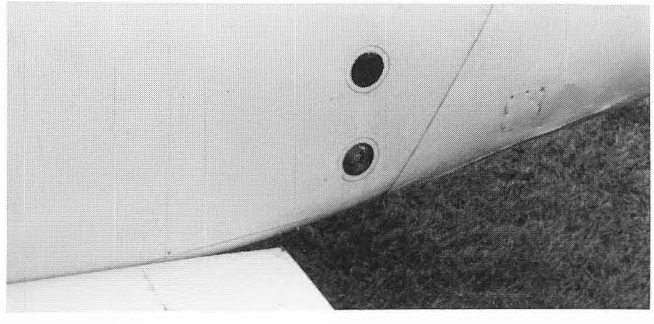
*On the right side of the fuselage, just in front of the weapons bay doors, is a small vent for the air conditioning system.*



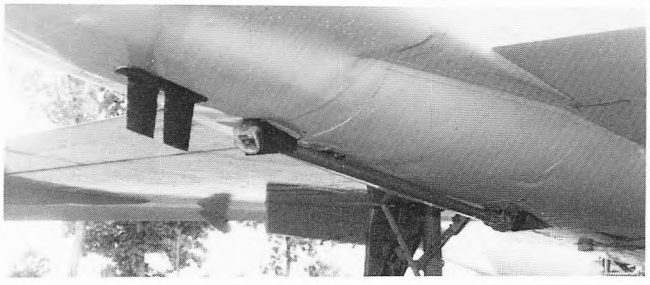
*The Ram Air Turbine (RAT) was located on a pop-open door on the right side between the weapons bay and main gear well. This turbine had a ten-blade, variable-pitch fan which drove a back-up hydraulic pump. This pump could operate the control surfaces, landing gear, and the speed brake in an emergency.*

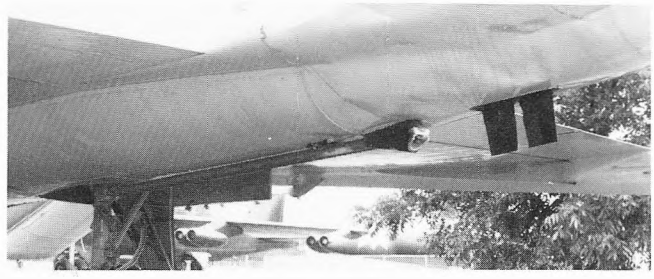
*These two views show the barrier probe in the extended position. It was added in the 1957-58 time frame.*



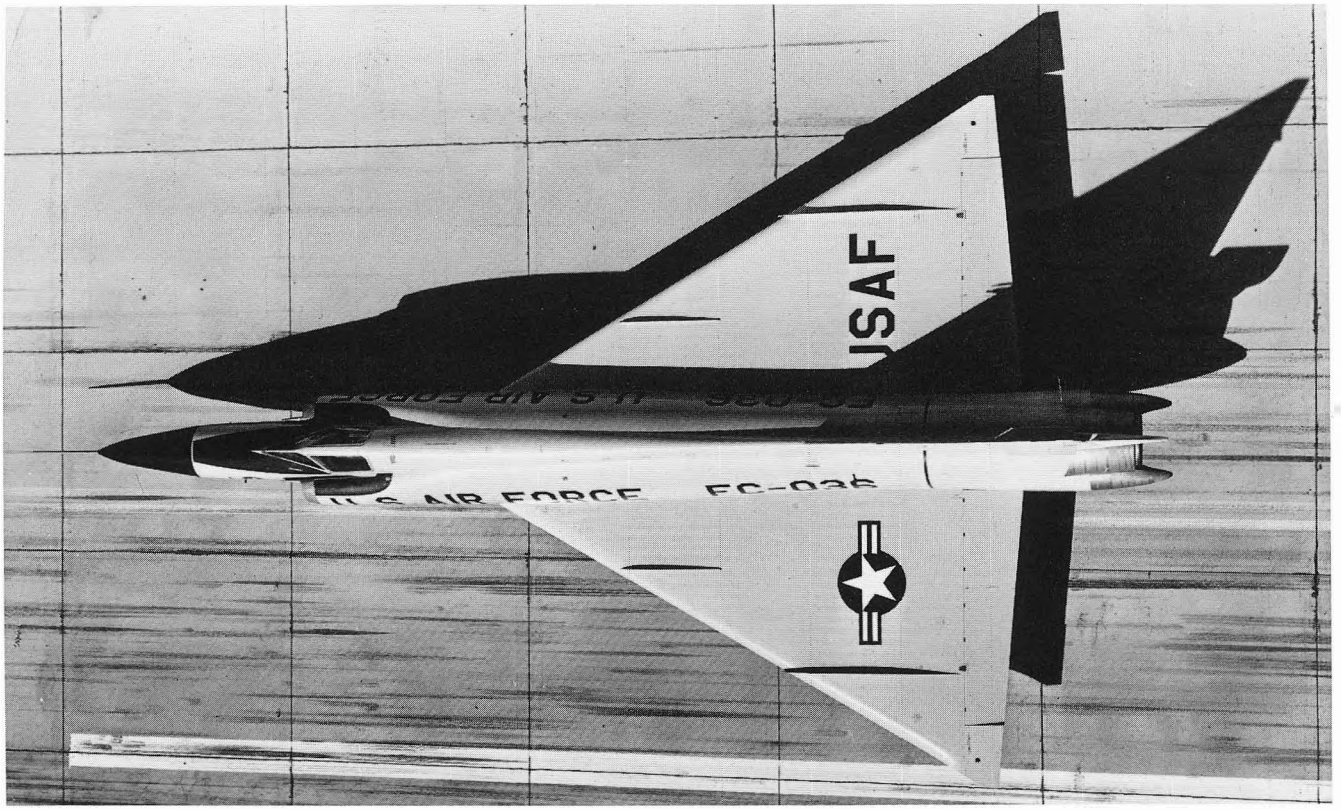


*A pair of lights are located on the aft fuselage just behind the trailing edge of the wing.*

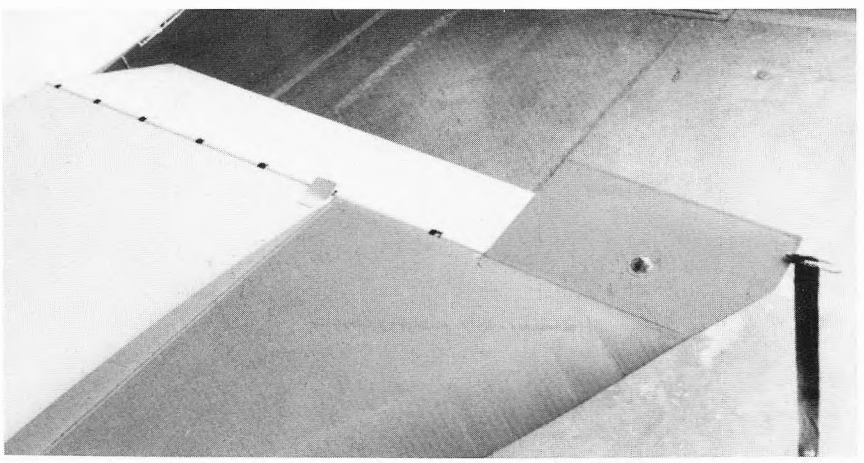




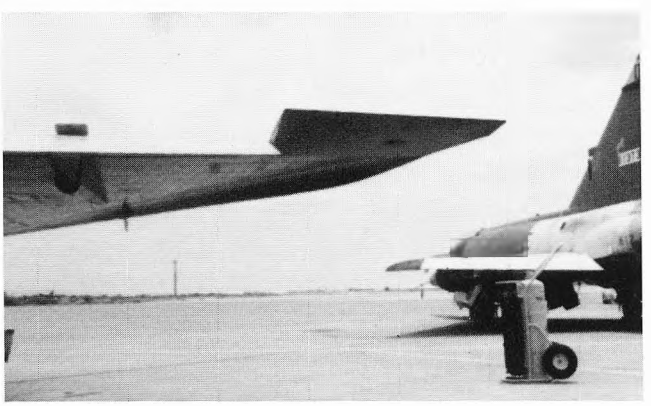
*The tail hook and data link antennas are seen in these two photographs. The hook was added around 1960, while the data link antennas began to make their appearance in 1965.*




*The first wing used on production aircraft was known as the Case X (Case Ten) wing as shown here. Note the squared-off tips and the shape of the elevons. (USAF)*

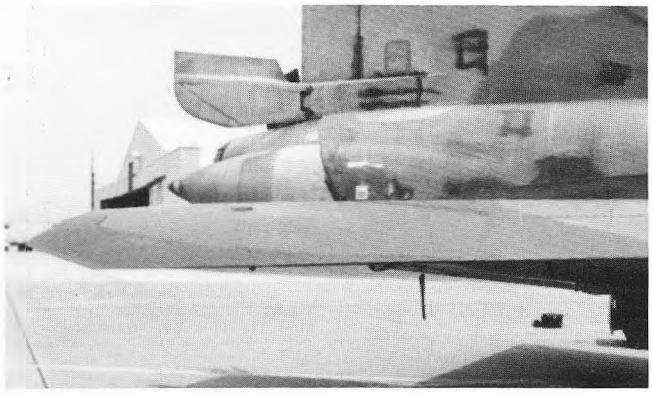


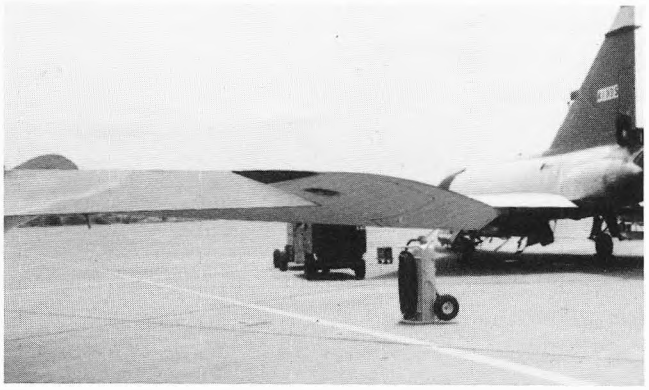
*This close-up shows the wing tip and elevon on the left wing. Note how the outer edge of the elevon is parallel to the centerline of the aircraft. The position light is visible on the wing tip.*



*These two photographs show the Case X wing tip from different angles. Note how the wing tip is turned up. The leading edge of the wing is only slightly turned down outside of the outer wing fence.*

## CASE XX WING

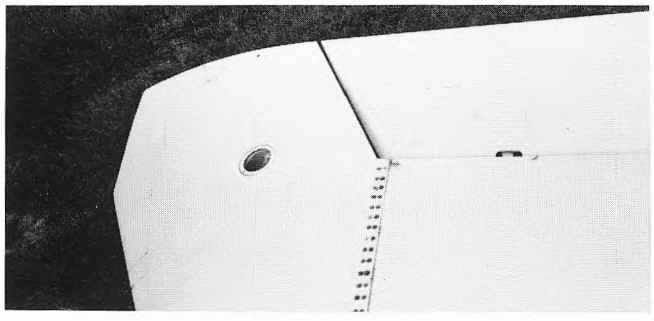


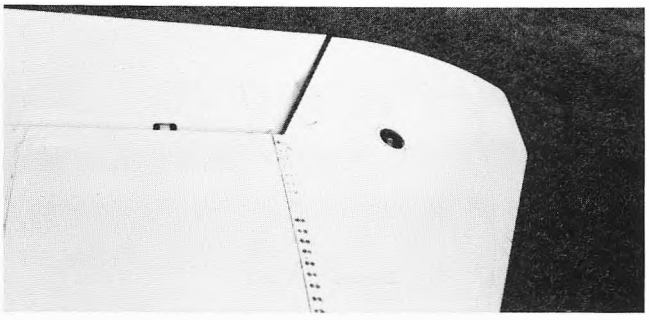


*Beginning with F-102A, 56-1317, the cambered Case XX (Case Twenty) replaced the Case X wing. It should be noted that it was not retrofitted to earlier aircraft. This wing had a different tip, curved down leading edge, and different elevons. These two photographs show the curved down wing tip from different angles.*

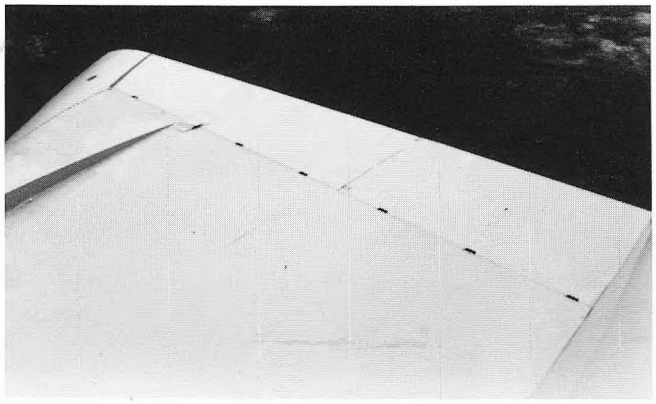
*The curved down wing tip and leading edge of the Case XX wing are clearly illustrated in this photograph.*

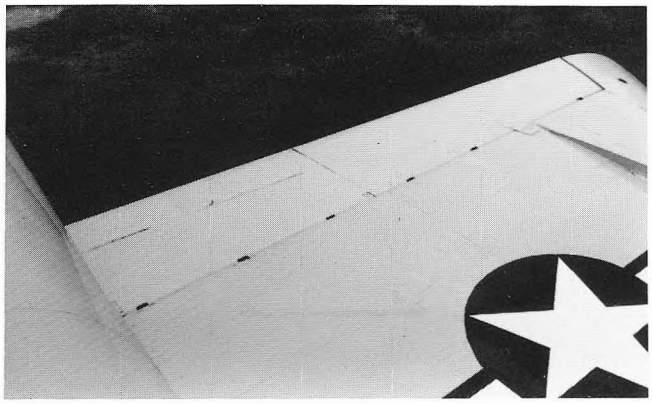
*The right wing tip of the Case XX wing is shown here from behind.*





*The two wing tips are shown here from above. What is important about these two views is that they show that the outer edge of the elevon angled outward rather than being parallel to the centerline of the aircraft as they were on the Case X wing.*

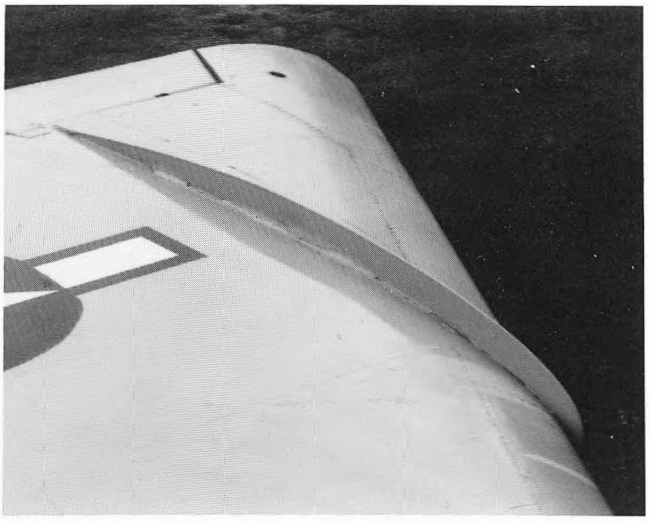




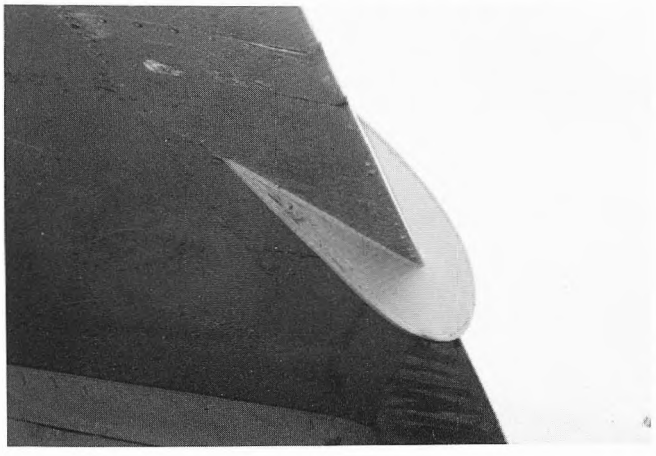
*These two photographs show the entire elevon on each wing.*

## BOUNDARY LAYER WING FENCES & ELEVON HINGE FAIRINGS

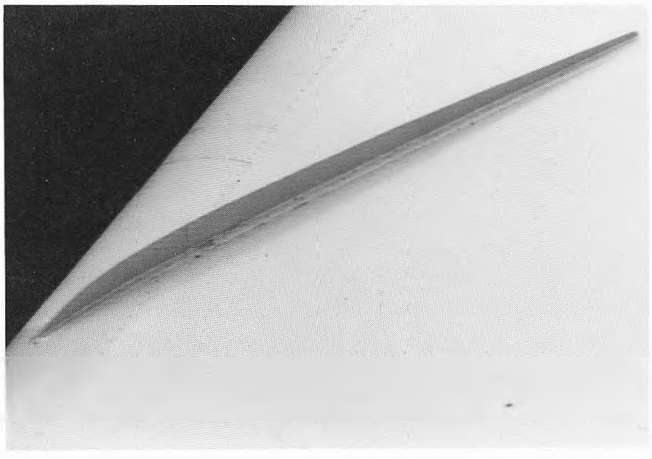
*Here is the outer wing fence on the right wing.*



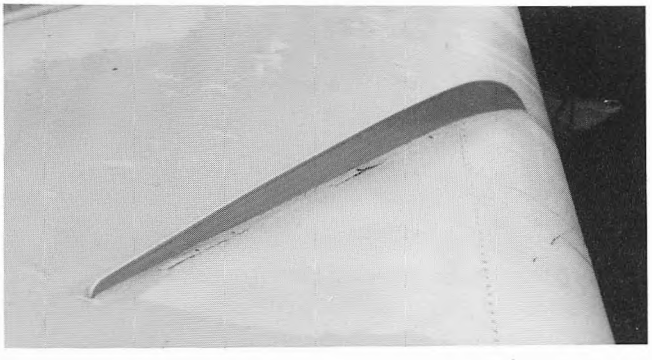
*This is the outer fence on the left wing.*



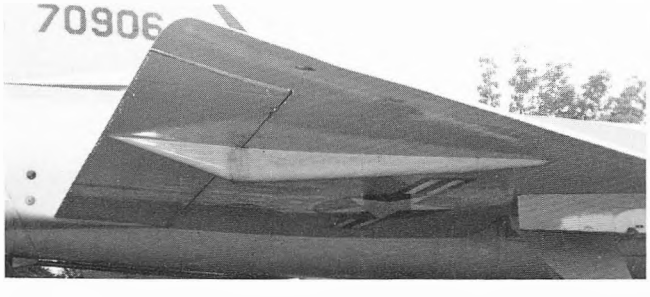
*This photo shows how the outer wing fence wraps around the wing's leading edge.*



*The inner fence on the left wing is shown here.*



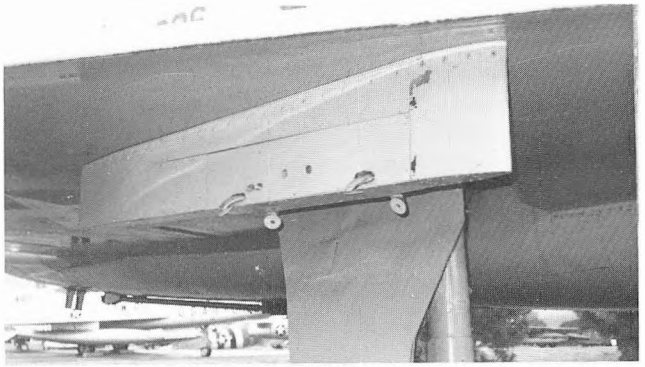
*The inner wing fence on the right wing is shown in these two views.*



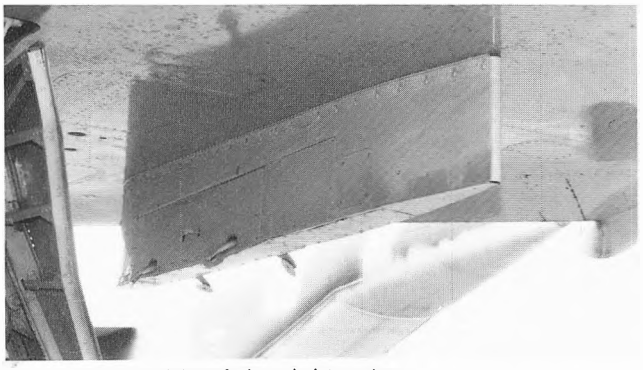
*The elevons on all wings on all versions of the Deuce were controlled through a linkage that was enclosed in a fairing under the wing.*

# FUEL TANKS & PYLON DETAILS

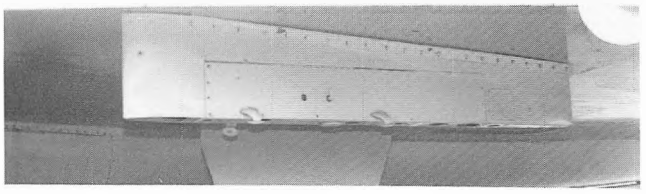
*With external fuel tanks attached, the F-102A became a subsonic aircraft, being limited to Mach .95. But flying missions over the vast reaches of Alaska, Canada, and the United States often required the use of these external tanks. Indeed, Deuces in Europe, PACAF, and Vietnam also routinely carried these tanks. This tank is shown attached to the pylon under the right wing of an F-102A. The Pennsylvania Air National Guard's 146th FIS belonged to the 112th Fighter Group.*



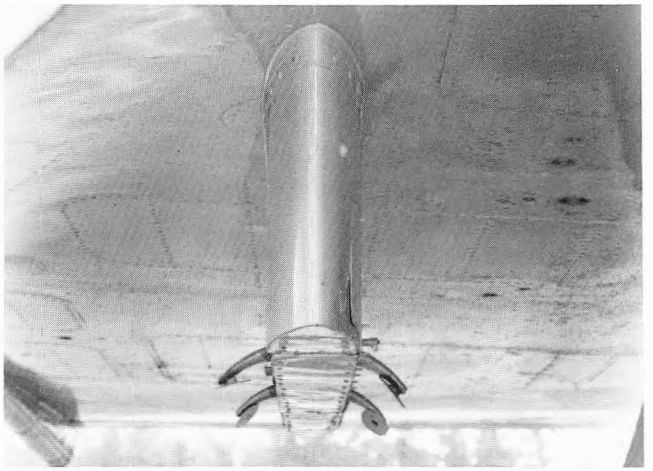
*Details of the right pylon with its sway braces are revealed in this view taken from the outside.*



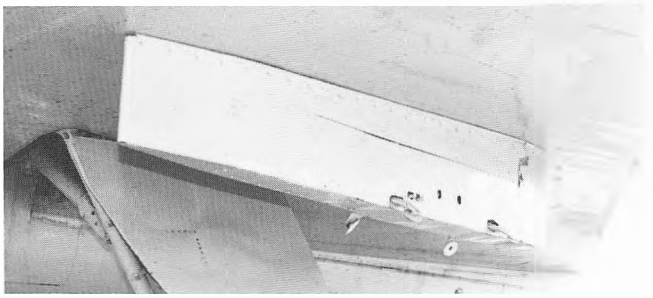
*This is the inside of the right pylon.*



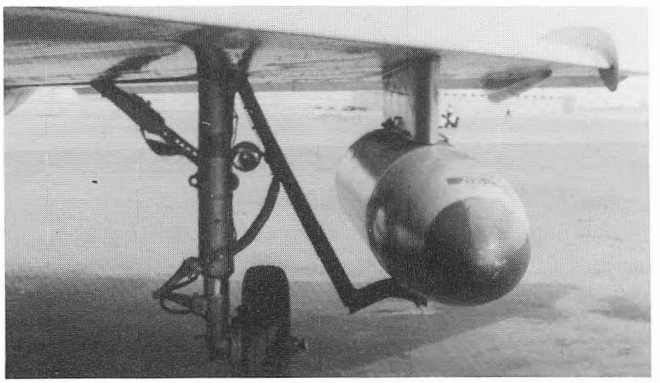
*This is the left pylon without the fuel tank attached.*



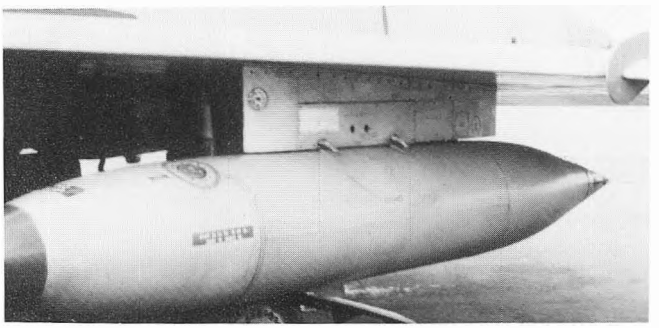
*This head-on view of the right pylon shows its cross section, thickness, and sway braces to good effect.*



*The right pylon is shown from the outside and slightly behind in this view.*

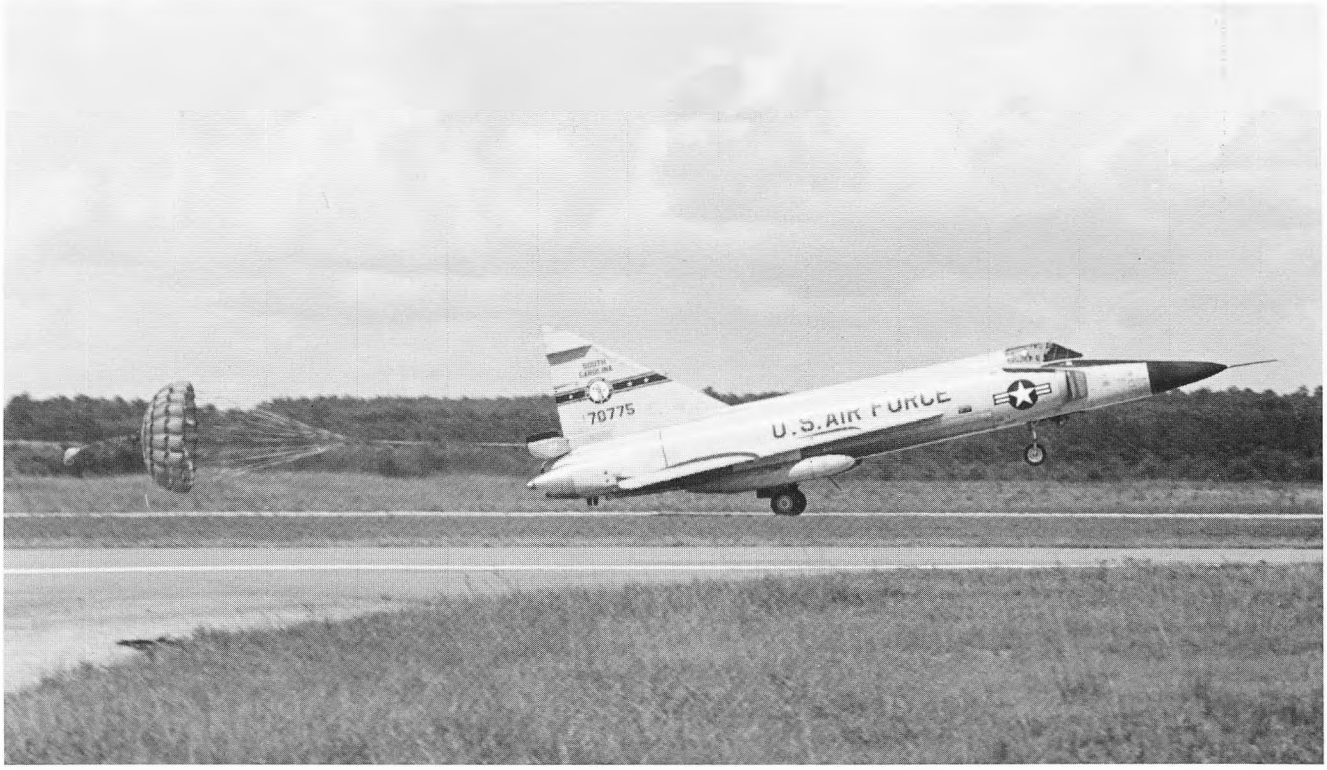


*The tank and pylon under the left wing are shown here from the front.*

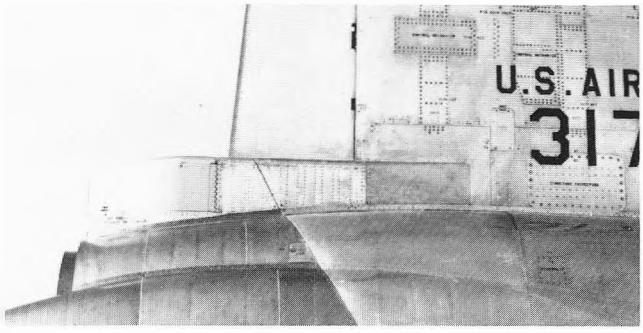


*Here the fuel tank is attached. Although they are difficult to see in this photograph, the tank has two small horizontal fins at the aft end, one being on each side. Also note the filler cap on top of the tank.*

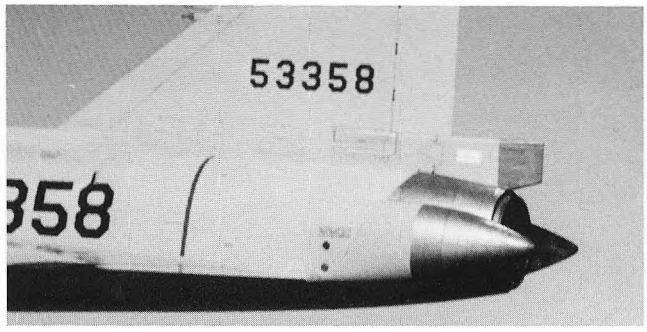
# DRAG CHUTE HOUSING & SPEED BRAKE DETAILS



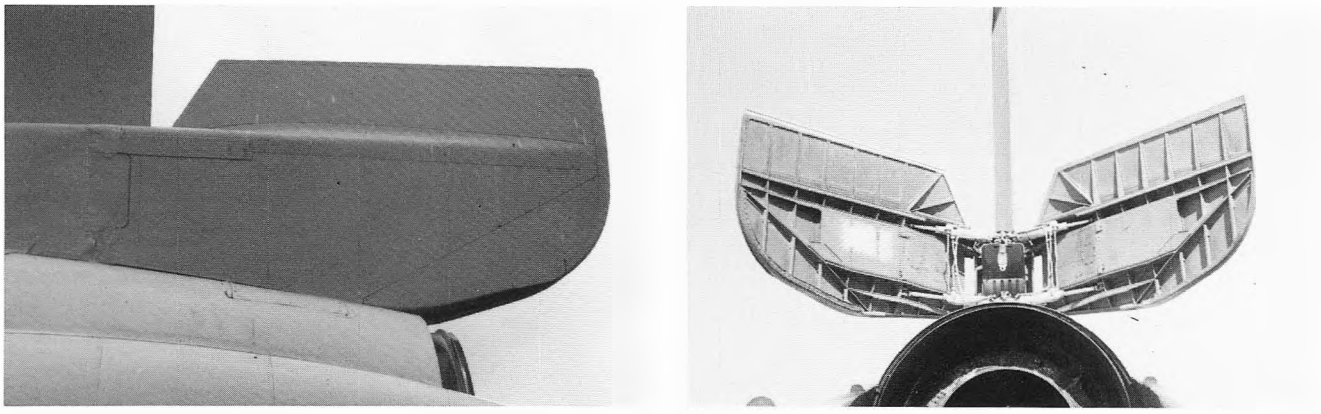

*To brake the aircraft on landing, the pilot would hold the nose up to use the aerodynamic braking of the wing. The speed brake would be opened, and a drag chute would be released from its compartment within the speed brake as shown here. The brakes on the landing gear would also be used.* *(Sullivan)*




*The speed brake used on the YF-102A is shown in this close-up view of the tail.* *(USAF)*

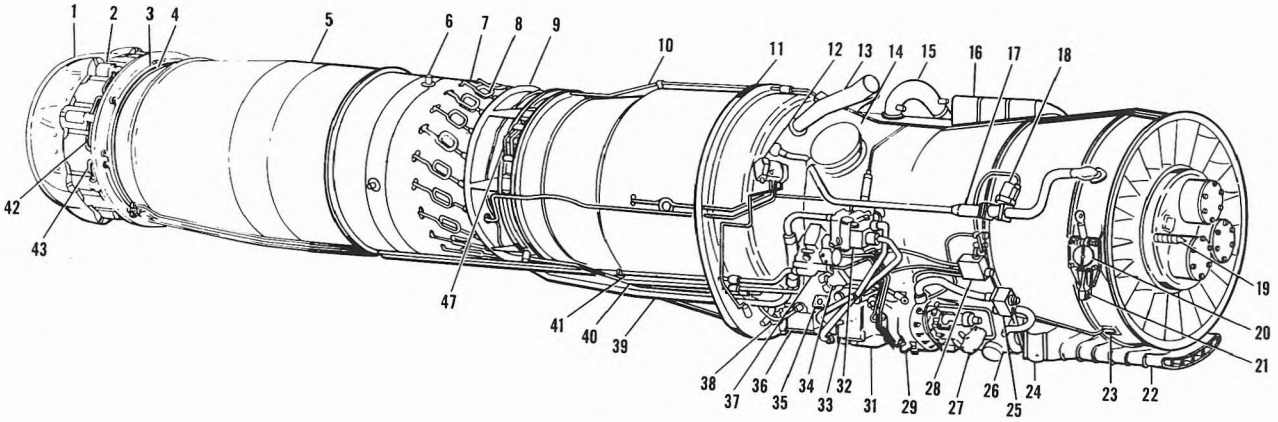


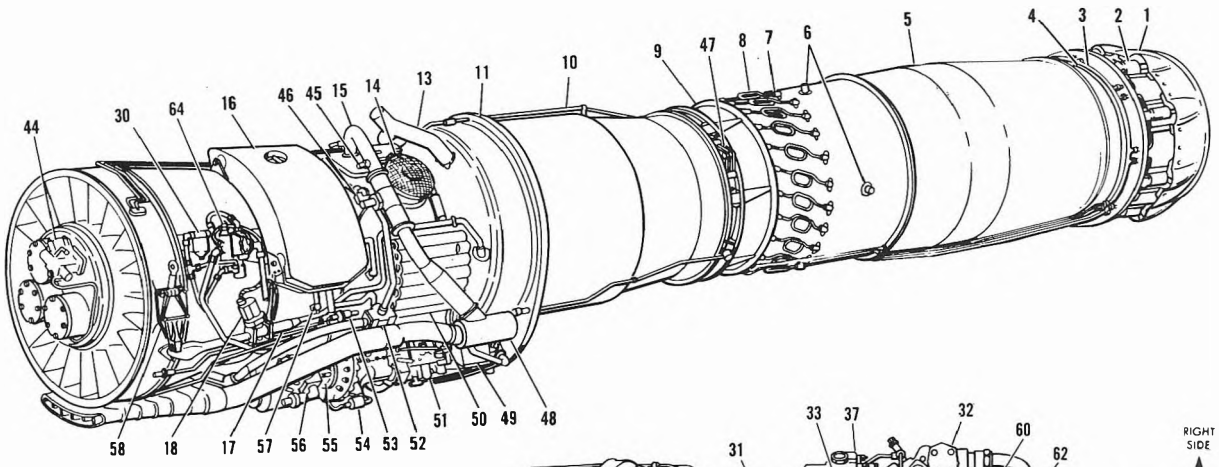

*This is the smaller speed brake used on early production aircraft.* *(USAF)*

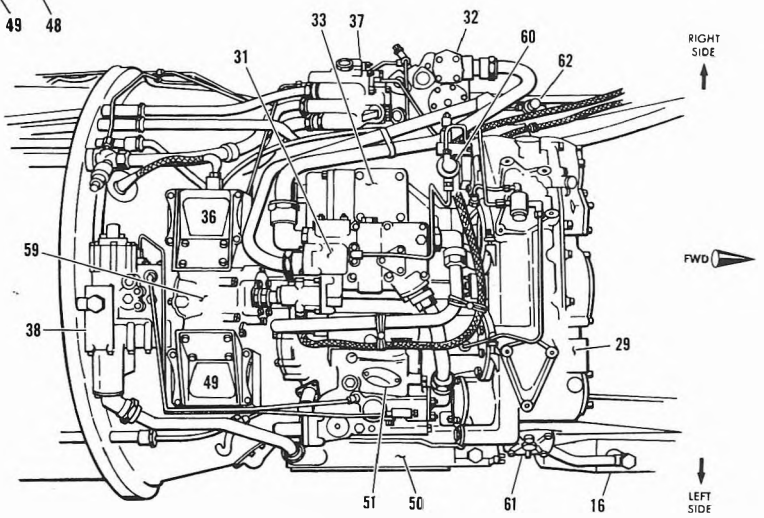


*Here is the larger speed brake that became standard for most F-102 production aircraft. The speed brakes were usually referred to as "boards" by pilots and ground crew personnel. At left is the closed speed brake viewed from the left side, and at right is the opened speed brake as seen from behind. The compartment for the drag chute is at the center of the hinge area.*

# ENGINE DETAILS



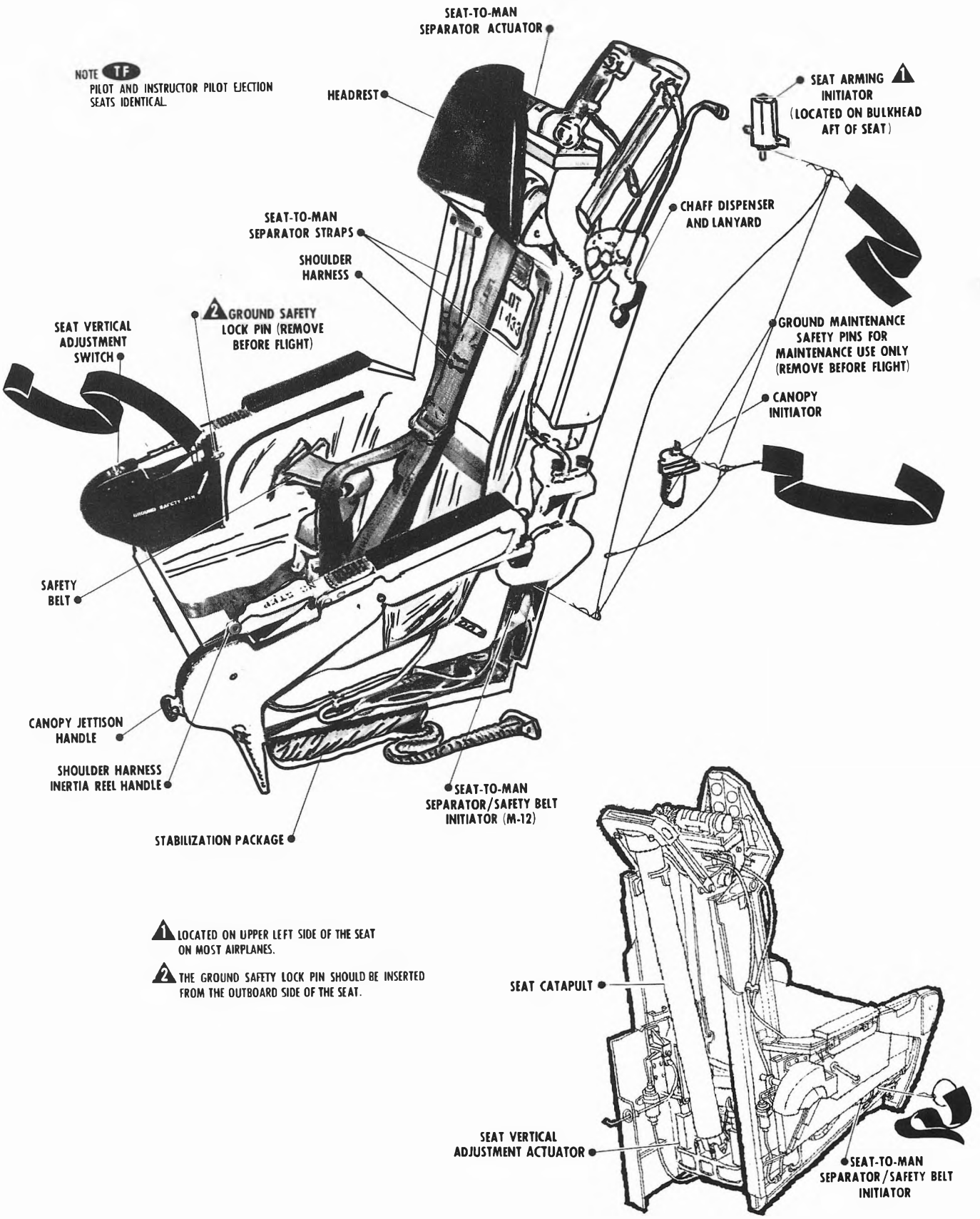




ENGINE ACCESSORIES
VIEW LOOKING UP

1. Flap type afterburner exhaust nozzle.
2. Exhaust nozzle actuating cylinders.
3. Exhaust nozzle actuating cylinder open manifold.
4. Exhaust nozzle actuating cylinder closed manifold.
5. Afterburner intermediate duct.
6. Afterburner flame holder tie rod boss.
7. Afterburner spray bar connection.
8. Afterburner fuel nozzle tubes.
9. Afterburner fuel manifold.
10. Breather pressurizing tube.
11. Shroud fire seal diaphragm.
12. Afterburner igniter fuel valve.
13. Bleed air manifold (low pressure pneumatic system).
14. Anti-surge bleed valve assembly.
15. Alternate cooling bleed air duct.
16. Engine oil tank.
17. Engine anti-ice air regulator.
18. Engine anti-ice air valve.
19. Anti-surge bleed governor temperature bulb.
20. Thrust mount.
21. Engine roller and bracket, SE 1-24
22. Air-oil cooler and shroud air inlet duct.
23. Main fuel control temperature sensing bulb.
24. Air-oil cooler.
25. Oil breather pressurizing valve.
26. Engine starter.
27. Primary hydraulic pump.
28. Engine junction box.
29. Oil pump and accessory drive housing.
30. Constant speed drive unit oil filter.
31. Fuel pump transfer valve.
32. Afterburner fuel control.
33. Engine and afterburner fuel pump.
34. Fuel flowmeter.
35. Engine and afterburner fuel supply inlet.
36. Right-hand ignition transformer.
37. Exhaust nozzle actuator control.
38. Fuel pressurizing and dump valve.
39. Afterburner fuel manifold supply line.
40. Exhaust nozzle open line.
41. Exhaust nozzle closed line.
42. Exhaust nozzle actuating cylinder closed line.
43. Exhaust nozzle actuating cylinder open line.
44. Anti-surge bleed governor.
45. Fuel tank pressurization line fitting.
46. Alternate cooling air valve.
47. Aft engine mount.
48. Shroud cooling air duct check valve.
49. Left-hand ignition transformer.
50. Fuel-oil cooler.
51. Main fuel control.
52. Fuel-oil cooler thermostatic valve.
53. Oil low pressure warning switch.
54. Fuel low pressure warning switch.
55. Constant speed drive unit gear box.
56. Secondary hydraulic pump.
57. Oil tank drain valve.
58. Left-hand forward engine mount.
59. Accessory drive adapter.
60. Exhaust nozzle control fuel filter.
61. Main oil strainer.
62. Igniter fuel valve fuel filter.
63. Deleted.
64. Constant speed drive unit oil recirculating valve.

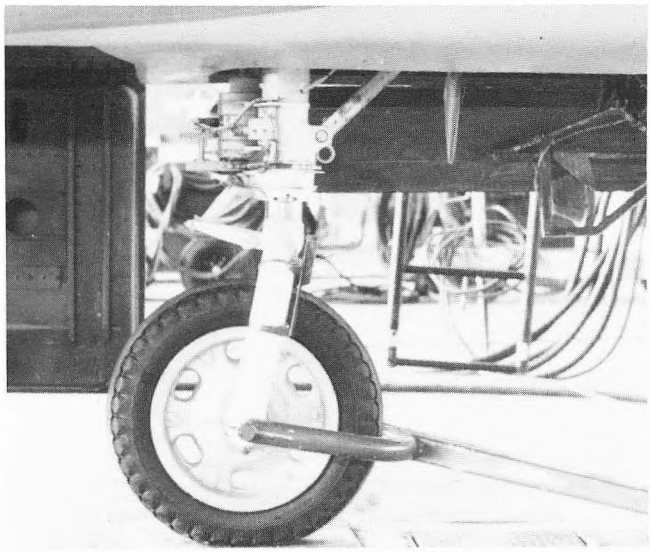
*Features of the J57 engine as installed in the Delta Dagger are shown in this drawing.* *(USAF)*

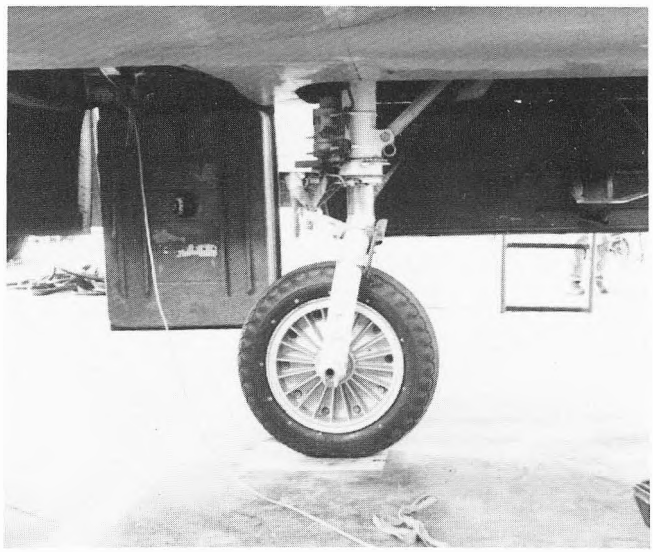
# EJECTION SEAT DETAILS


SEAT-TO-MAN SEPARATOR ACTUATOR
NOTE TF
PILOT AND INSTRUCTOR PILOT EJECTION SEATS IDENTICAL
HEADREST
SEAT ARMING 1 INITIATOR (LOCATED ON BULKHEAD AFT OF SEAT)
CHAFF DISPENSER AND LANYARD
SEAT-TO-MAN SEPARATOR STRAPS
SHOULDER HARNESS
2 GROUND SAFETY LOCK PIN (REMOVE BEFORE FLIGHT)
SEAT VERTICAL ADJUSTMENT SWITCH
GROUND MAINTENANCE SAFETY PINS FOR MAINTENANCE USE ONLY (REMOVE BEFORE FLIGHT)
CANOPY INITIATOR
SAFETY BELT
CANOPY JETTISON HANDLE
SHOULDER HARNESS INERTIA REEL HANDLE
SEAT-TO-MAN SEPARATOR/SAFETY BELT INITIATOR (M-12)
STABILIZATION PACKAGE
1 LOCATED ON UPPER LEFT SIDE OF THE SEAT ON MOST AIRPLANES.
2 THE GROUND SAFETY LOCK PIN SHOULD BE INSERTED FROM THE OUTBOARD SIDE OF THE SEAT.
SEAT CATAPULT
SEAT VERTICAL ADJUSTMENT ACTUATOR
SEAT-TO-MAN SEPARATOR/SAFETY BELT INITIATOR

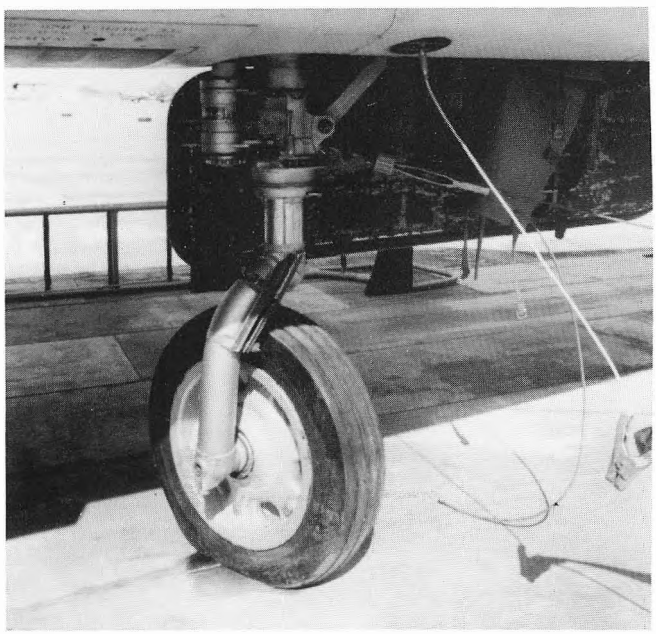
*This drawing shows details of the ejection seat as used in the F-102. A color photograph of an installed ejection seat appears on page 36.* *(USAF)*

# NOSE LANDING GEAR

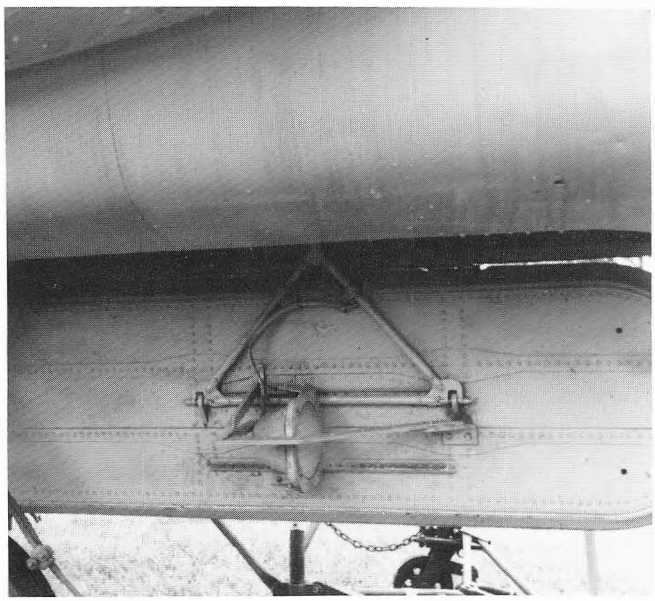




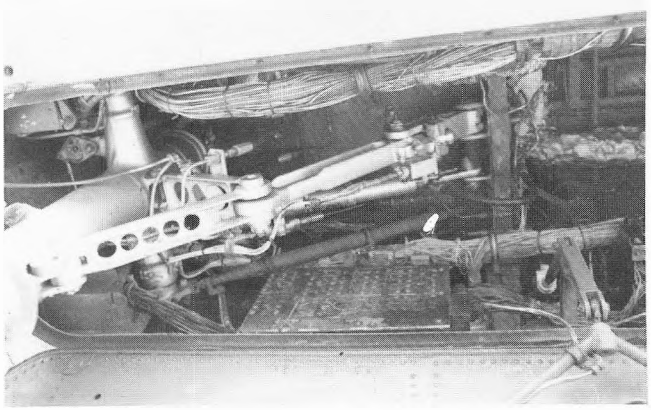
*Several different wheel designs were used for both the nose and main wheels throughout the Deuce's operational life. Different wheels could be seen at any one time since one design did not entirely replace another. At left is a nose wheel with holes in it, while at right is a solid but spoked design.*

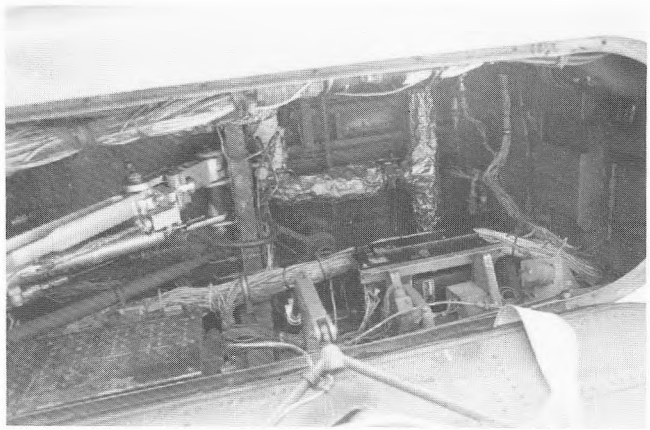


*This view shows the nose gear strut in better detail.*



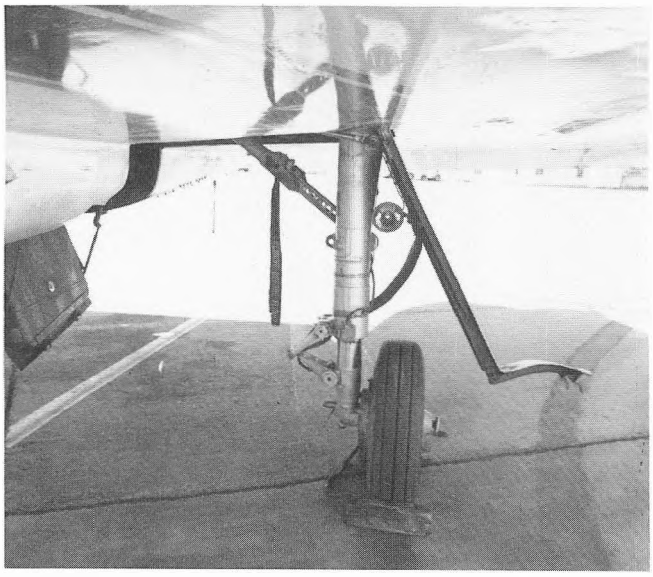
*Details of the taxi light on the nose gear door can be seen here.*





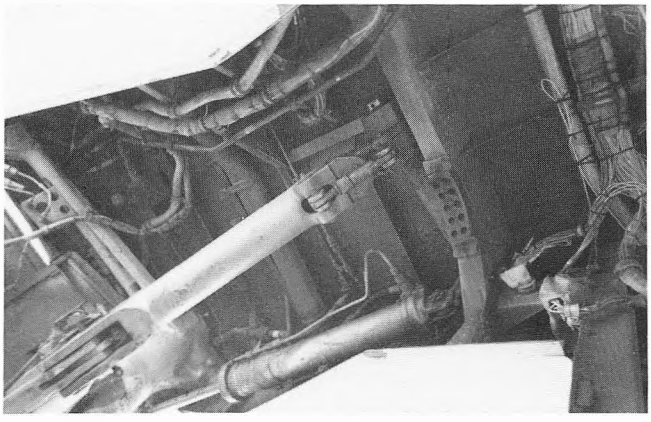
*These two views show the nose gear well. The photo at left is of the aft end of the well and shows how the strut attaches to the inside of the well. At right is the forward end of the well.*

# LEFT MAIN LANDING GEAR

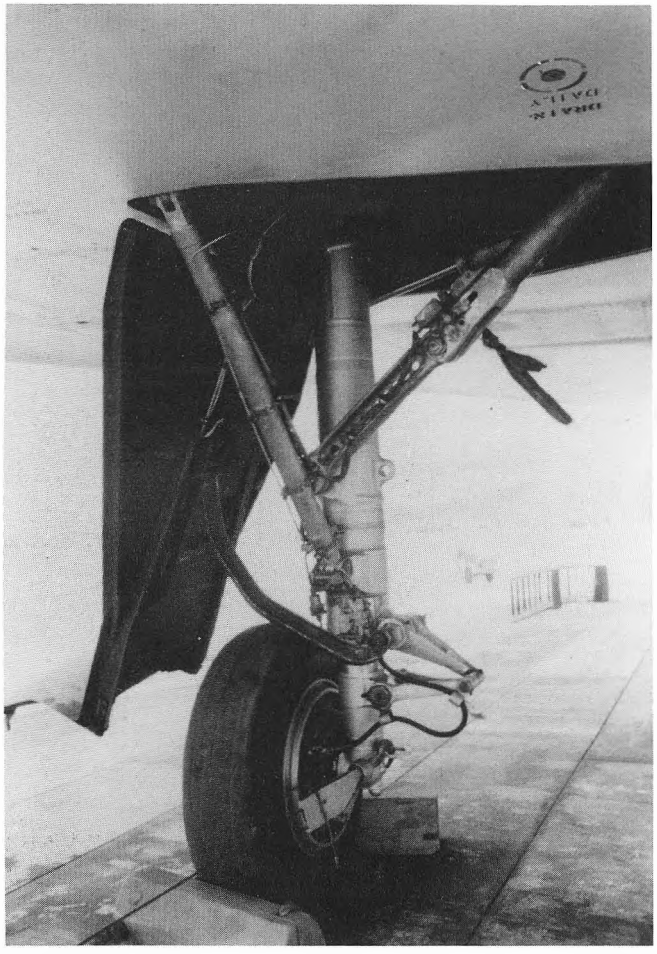


*This is the left main landing gear as seen from the front. Note the light between the strut and the door.*

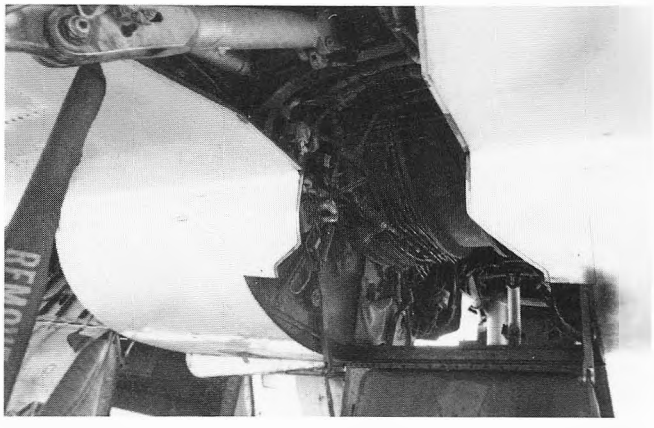
*There were about five different main gear wheels used on the F-102, and this is the latest one. It was the same as the later one used on the F-106. Details of the outer left main gear door are also visible.*



*This view looks up and out into the left main gear well.*



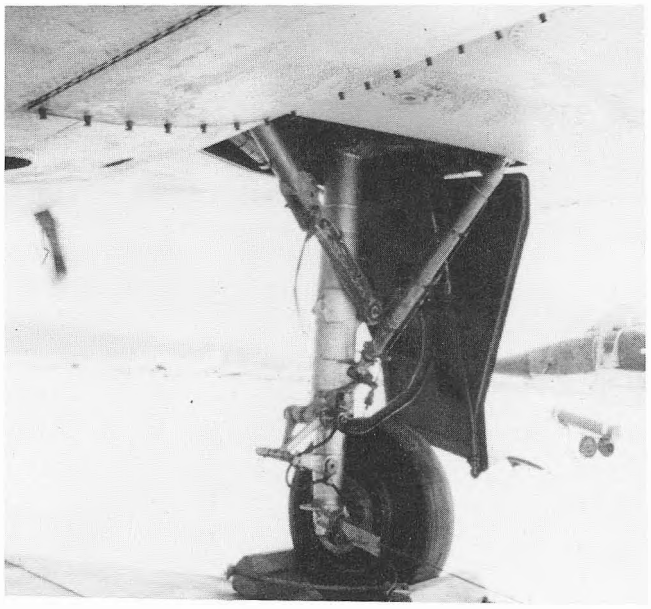
*Details of the struts, inner wheel, and the inside of the main door are visible in this photograph taken from behind. On early F-102s the main gear strut was vertical, being perpendicular to the wing, but on later aircraft, the main gear was noticeably angled forward. This changed the center of balance (rotation) of the aircraft meaning the nose was "heavier" on the Deuces with the straight gear and "lighter" on the ones with the canted gear. Rotating the aircraft on take-off and lowering it on landing was different for the later aircraft with the angled gear than it was for the earlier straight gear Deuces.*



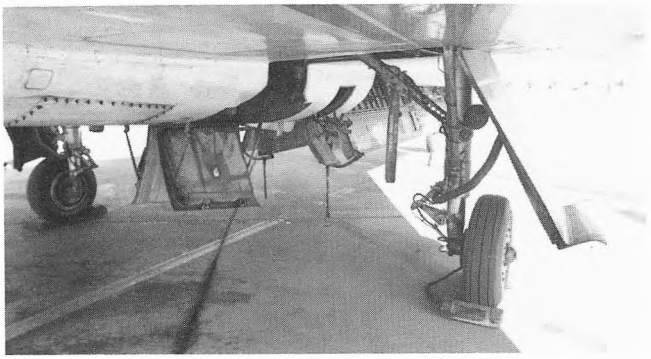
*With the center landing gear doors in the open position, details of the center gear well are visible in this photograph.*

# RIGHT MAIN LANDING GEAR

*Here is the right main gear as viewed from the front. The light and angle of the outer main gear door are clearly visible.*

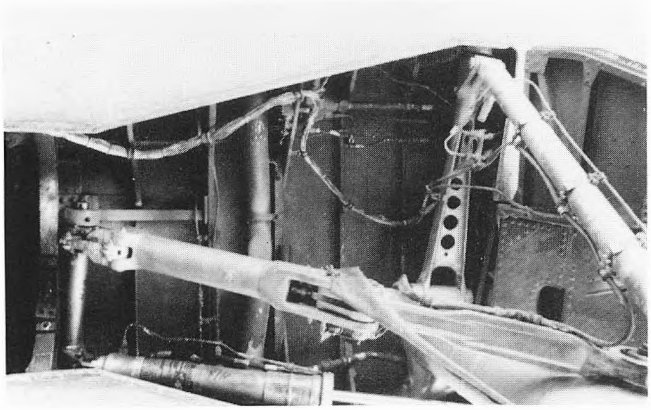


*The right main gear is shown from the inside in this photo.*

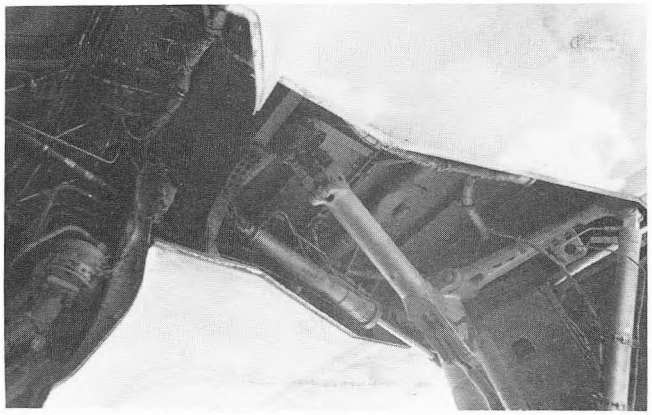


*The gear and both the inner and outer doors can be seen here.*

*Two of these actuating rods opened and closed the inner main gear doors. This photograph also shows the RAT from behind.*



*The outer portion of the right main gear well is visible in this photograph that looks straight up. Forward is to the bottom of the picture.*

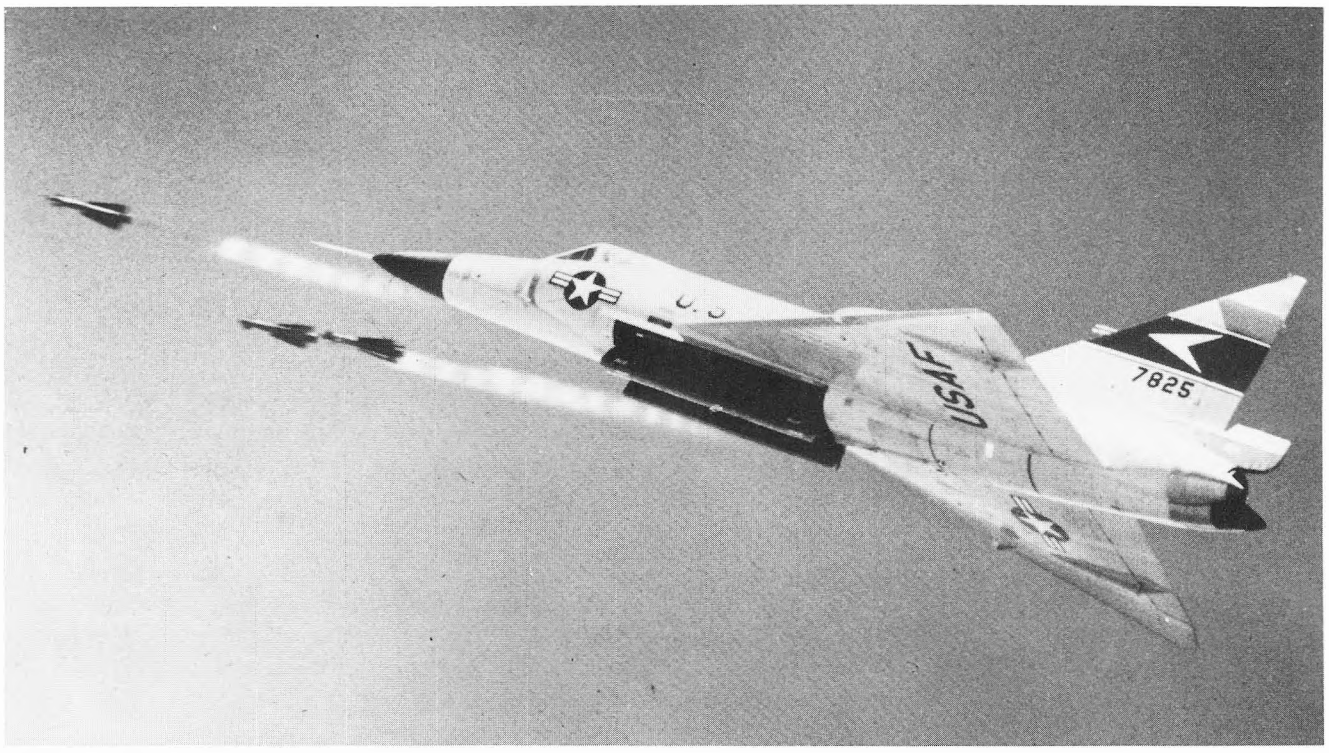


*This is another view of the right main gear well. It was taken from slightly behind the well and looks up and forward into the well.*

# WEAPONS BAY & ARMAMENT

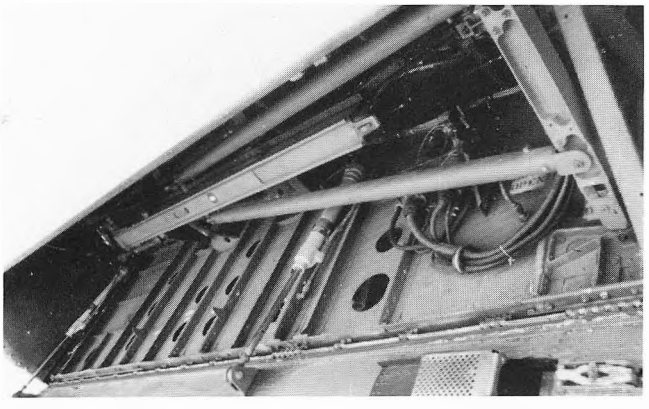
*The proper angles for the open weapons bay doors and the extended missiles and rails are shown in this front view. Also note the holes in the forward ends of the doors for the 2.75-inch rockets. (USAF)*

*More details of the inert Falcon missiles and the weapons bay are visible here. Additionally, design details of an early main landing gear wheel, the leading edge of a Case X wing, and the early elevon hinge fairing are also visible. Compare this to the hinge fairing shown on page 54. (USAF)*

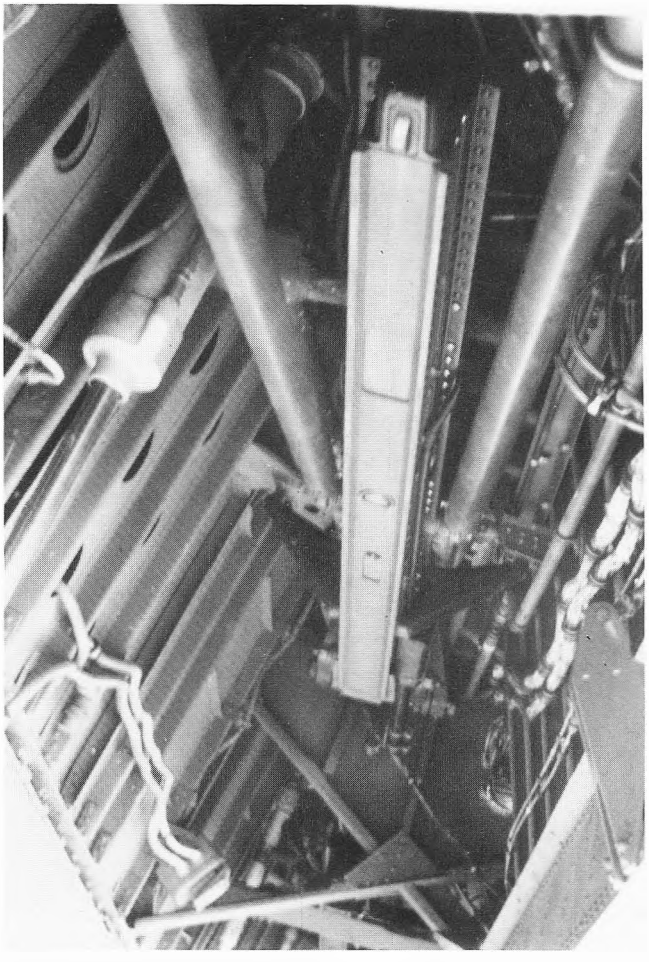



*The weapons bay doors open, the missile rails extended, and the Falcons fire in less time than it takes to tell about it. Here three AIM-4s streak away from an F-102A during firing exercises. (USAF)*

*This is the forward end of the right missile bay showing the front missile rail in the retracted position. The view looks aft from the forward edge of the bay.*



*This is the rear missile rail in the right bay. Two of the cylinders that actuate the lower door for this bay are visible.*



*The forward rail in the left bay is shown here.*

# PAVE DEUCE DRONE PROGRAM

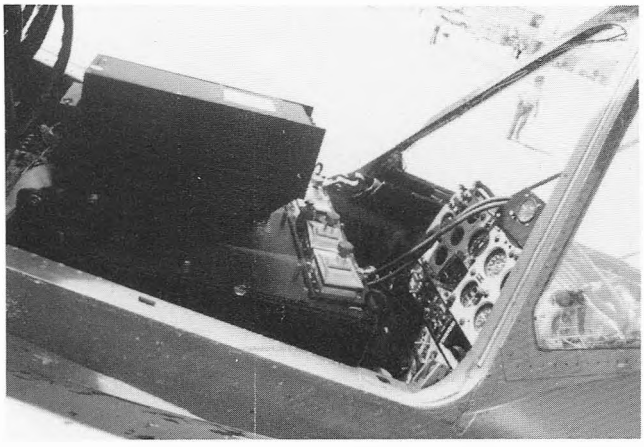
*This QF-102A was photographed at Holloman AFB, New Mexico. The fact that this is an "A Model" is ascertained from the number **656** on the aft fuselage. Numbers beginning with a **5** or a **6** designate QF-102As and those beginning with a **7** or **8** indicate a PQM or MPQM-102B.*

*Deuce drones are also used at the William Tell Weapons Meet at Tyndall AFB, Florida. This freshly painted QF-102A was on display next to the scoring board.*

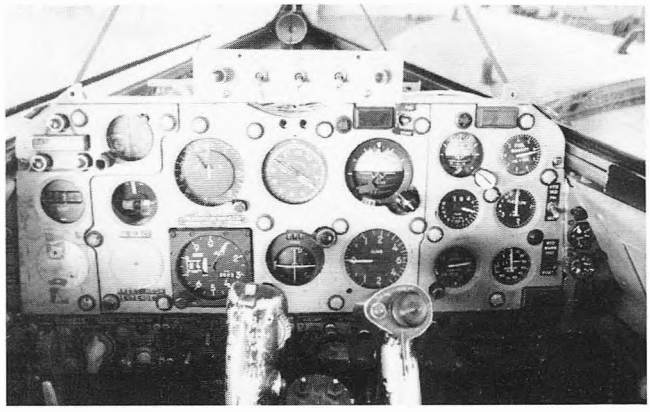
There has always been a need for high speed drones to serve as targets for various weapons systems. Pilots need a realistic "adversary" against which they can fly their aircraft and fire their weapons. Air defenders on the ground also require a target against which they can train and conduct evaluations of their skills and weapons. The need for such drones also exists for new systems that are being developed. New aircraft and anti-aircraft weapons of all types must be tested and evaluated against realistic targets. There are a number of drones that are specifically designed to perform these missions, but these often lack the realism and capabilities that an actual aircraft can provide.

The idea to use the F-102 as a supersonic, realistic, and low-cost drone was born in 1970 as the aircraft was being retired in large numbers. By 1972 the program, that became known as Pave Deuce, was well underway, and Sperry Rand was placed in charge of it. Fairchild Aircraft Service Division did the modifications. All fire control and weapons-related equipment was removed from the aircraft to include the radar scope, vision splitter, and optical sight in the cockpit. The missile rails were removed from the weapons bay, and the MG-10 fire control system was eliminated from the nose. Except for a few small antennas added to the spine and a smoke-making device, the tube of which ran under the aft fuselage, there was very little in the way of external differences between the drones and regular F-102s. The first few drones were man-rated QF-102s, which had their drone control equipment located on a pallet behind the cockpit. These were followed by the PQF-102 drones that had a control box, known as a Flight Control Stabilization System (FCSS), in place of the usual ejection seat. These aircraft were not man rated. The first flight of a manned drone took place on January 10, 1974, and this was followed on August 13, 1974, with the first flight of a PQF-102.

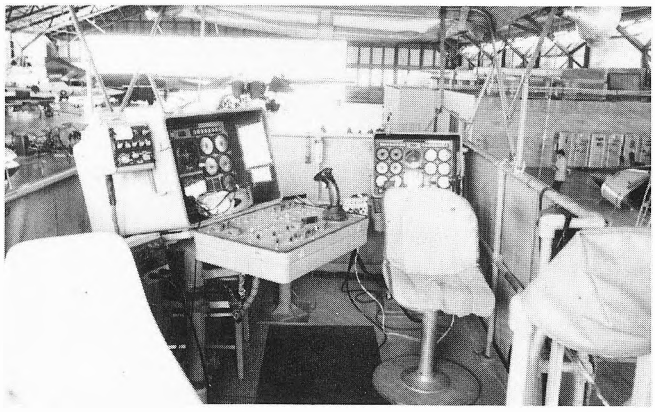
As more and more F-102s became available for conversion to the drone configurations, two new "second generation" drones were placed in service. These became known as "B models," and had the -B suffix added to their designations. Most of these were PQM-102Bs which were pure nullo drones controlled from a mobile or fixed ground control station. Usually the drone was launched and landed by the mobile station, with the rest of the flight being handled by the longer range fixed station. The second "B model" was the MPQM-102B which was man-rated. Both of these systems had the majority of their drone control equipment located in the nose spaces formerly occupied by the MG-10 fire control system. They had a tank in the center weapons bay that



*The PQM-102 had a control pallet or "box" in place of the seat as shown here.*



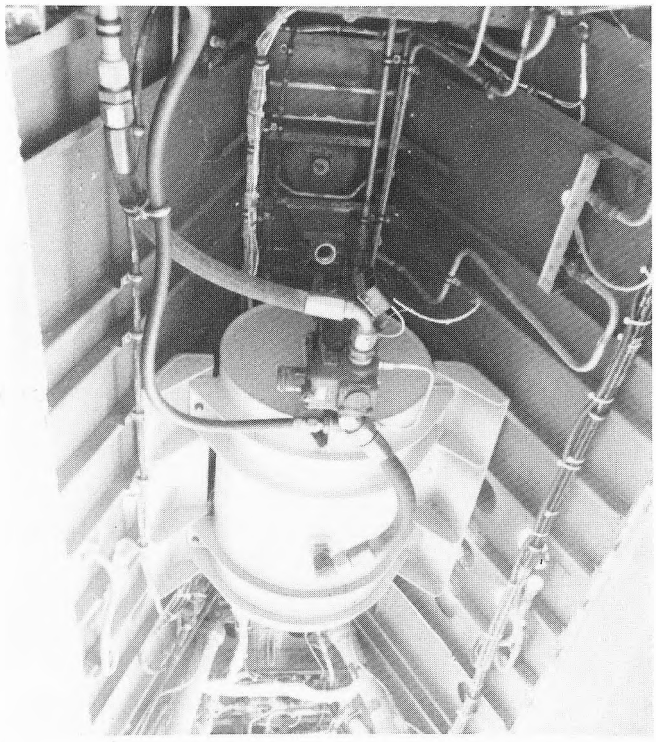
*This is the instrument panel in the man-rated QF-102A. This version had a control system located behind the cockpit.*



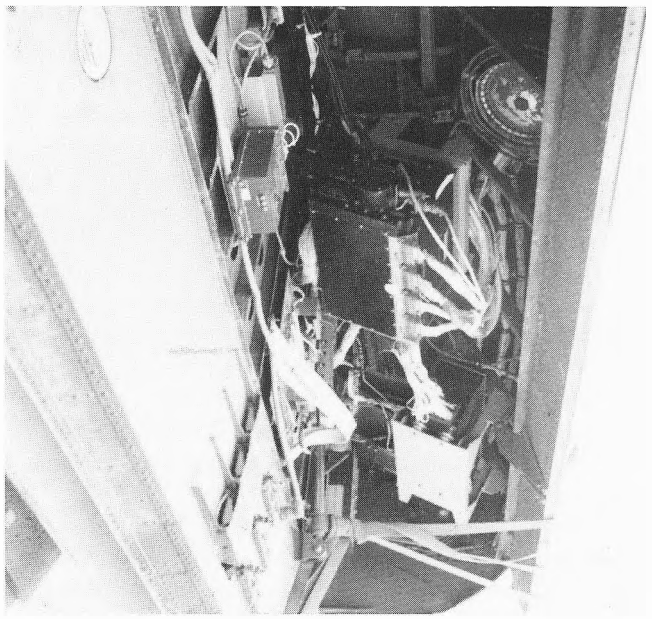
*Drones can be controlled from this mobile control station (MCS). After take-off, the drone is usually handed off to a fixed ground control station. This station has a range of about fifty-miles, while the fixed station can fly the drone up to 200 miles away. A two-man team flies the drone, one controlling it vertically and the other horizontally.*

was part of a smoke system that could be used to help spot the drone visually. Also carried in the center section on all unmanned flights was a Mk-48 warhead that could be used to explode the drone if necessary.

Over the years the F-102 drones have been involved in many programs, with most of the work being done at Holloman AFB, New Mexico, and Tyndall AFB, Florida. Holloman AFB is just up the road from El Paso, Texas, home of the U.S. Army's Air Defense School. The drones have been used as targets for some of the Army's air defense weapons, most notably the Stinger shoulder-fired missile. Others were used in the F-15 program to simulate enemy fighters, and still more have been used as



*This is the smoke tank located in the center weapons bay.*

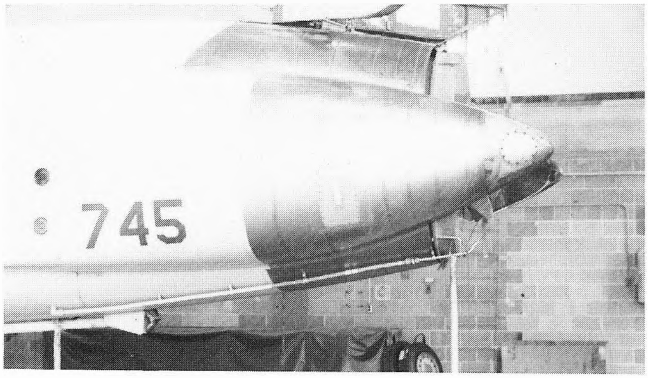


*The computer interface box is located in the right missile bay of the PQM-102B.*

targets at the William Tell Weapons meet held every other year at Tyndall AFB.

In most cases there was little done to the paint on the aircraft. The F-102s were simply modified in whatever scheme and markings were applied by its last unit. The vertical tail and wing tips were painted red or red/orange, and that was it. In one case an aircraft was given an overall gloss white paint scheme that was trimmed in red (see page 40). A few other drones received a fresh coat of ADC gray paint, then had the usual red added to the tail and wing tips. An example of this appears at the top of the previous page. Three-digit numbers were added to the nose or tail of the drones, with those starting with a 5 or 6 being "A models," and those starting with a 7 or 8 being the later "B models."

As an interesting footnote to the Pave Deuce program, it should be noted that the last TF-102A in service, 56-2317, named "La Tina" supported the drone program for a time. Pilots who would fly the man-rated drones were familiarized with the F-102's flight characteristics in this aircraft.




*The line for the smoke generating system runs from the tank in the weapons bay to the engine exhaust.*

# MODELERS SECTION

General Comments

The F-102 was the first production aircraft with a delta wing, the first supersonic interceptor, and the first aircraft to carry guided missiles in an internal weapons bay. It was a very attractive aircraft design, and, during its operational life, it carried some of the more colorful markings of any U.S. Air Force aircraft in history. Considering this, it would seem certain that it would have been the subject of many modeling releases. But unfortunately this has not been the case. To date, only one injection molded kit has been issued in the most popular 1/72nd scale, and it has now been around for over twenty-five years. It has been re-released numerous times, but usually only the box art and decals have been changed. Only in the latest issue has an update or improvement been made to the plastic, and these were very minor.

The only 1/48th scale kit so far has been the old Revell model (actually in 1/49th scale) that is even older than the 1/72nd kit. It was loaded with gimmicks, and not really a kit for the serious scale modeler. Fortunately, this scale is about to have a new release from Monogram, and this promises to be the best Deuce kit ever. Only a vacuformed kit from Combat Models represents the F-102 in 1/32nd scale. There are no models whatsoever of the TF-102A, so to build one of these the modeler has to modify a single-seat model from scratch or use the hard-to-find Airmodel conversion kit in 1/72nd scale.

For the modeler who likes to build in the smaller scales, there is a rather nice 1/144th scale model available that has been released by no less than four companies, but there is no Deuce available in 1/100th scale.

Other than the kits mentioned above, none of the other models released so far of the F-102 are ones that the serious scale modeler would really consider. We at Detail & Scale would like to see this situation corrected. Hopefully the new Monogram kit will be a success, and it will be released later as a two-seater like Monogram did with its F-105 (only in reverse). If not, then perhaps a company like War Eagle will do a conversion kit to permit the modeler to turn the Monogram F-102A into a TF-102A. It would also be nice to have a new and better 1/72nd scale kit, and here again, a Monogram kit that has been panagraphed down to 1/72nd scale would be great. But a kit from Fujimi that is of the quality of their latest 1/72nd scale models would also be most welcome. A good 1/100th scale kit and another in 1/32nd scale would also be nice to have, but these are unlikely, and would be gravy above the more important 1/72nd and 1/48th scale kits.

Another problem has been the lack of good decals. The decal companies and the kit manufacturers have done too much in the way of using each other's markings. There are plenty of decals for the California Air National Guard and the 32nd FIS for example, but most of the units that fly the Deuce have never been represented. Superscale's (formerly Microscale) 1/144th scale sheets are merely reductions of their 1/72nd scale sheets, and usually don't even fit the 1/144th scale model very well. Hopefully, if they do markings for the new Monogram kit in 1/48th scale, they will not simply enlarge their old 1/72nd scale markings. But if they do, it would be nice if they made sure they fit the new 1/48th scale kit! We just hope they offer some markings we have not seen before.

With the exception of 1/144th scale, a modeler wishing to build a good scale model of the F-102 has a lot of work to do. The Monogram 1/48th scale kit should go a long way to improve things, but the kit and decal manufacturers still have a lot they could do to make good kits and decals available for the F-102 in the other scales.

## KIT REVIEWS

**1/240th Scale Kits**

Monogram F-102A, Kit Number PA56

This kit was actually an Air Power set with eighteen aircraft sharing a common base. The aircraft are mounted to the base with a wire. It was released in 1959, and now has a value to collectors of between forty and sixty dollars.

Monogram F-102A, Kit Number P407

The F-102 in this set of five aircraft was the same as in the Air Power set covered above. This time the stand was plastic instead of wire. Decals for both issues consisted of only the basic Air Force and national insignia markings. The F-102 was a two-piece model with finely engraved control surfaces. The other models in the kit were the F-100D, F-101A, F-104A and F-105B. Price for the entire set now runs about ten to fifteen dollars on collectors' tables.

**1/144th Scale Kits**

Otaki F-102A, Kit Number OT2-23-100

This is one of the better 1/144th scale kits available of a fighter aircraft, and it assembles with little difficulty.

*The Arii/Otaki/Revell/Entex 1/144th scale kit has been issued several times by four companies. It is one of the better 1/144th scale fighters available.*

Relatively little filling and sanding is required. It consists of twenty pieces molded in light gray plastic and a clear canopy. Scribing is recessed and is generally nicely done for a kit this small, but it is a little heavy in some spots. The landing gear is simple, with only the major items represented as is usually the case in this small scale. The center main gear doors are molded in the closed position. Unfortunately, part of the outer main gear door is also molded and scribed into the fuselage. This same part of the outer main gear doors is also part of the separate door, so in essence, part of each outer main gear door is represented twice. Since the inner doors can be closed on the ground, the simple solution is to leave them closed and cut away the part on the lower fuselage that represents the lower, curved part of the outer main gear doors. The more ambitious modeler may want to open up the entire center main gear well in the fuselage and make new inner main gear doors from plastic card.

The weapons bay is molded in the closed position, but it could be opened up if desired. Some plastic card, wire, and bits of scrap plastic could be used to build an interior and launch rails, and Falcon missiles from the LS 1/144th scale weapons kit number S2 could be added. But this effort would only be recommended for the most ambitious 1/144th scale modeler.

The Case XX wing is represented with its camber and elevons which have angled outer edges. The tip is a little too squared off, and could stand a few rubs with fine sandpaper. By sanding off the curved down portion of the leading edge, modifying the wing tips slightly, and changing the scribing for the outer edges of the elevons, it would be a fairly simple matter to convert this wing to a reasonable Case X wing in this small scale. External fuel tanks and pylons are provided to go under the wings. The tail hook is also included, but there is no IR sensor and no data link antennas. These are easily added from scrap plastic if required for the aircraft being modeled.

One place that most modelers will want to do a little extra work is the cockpit. None is provided in the kit, but about ten minutes of work with a knife and a file, plus a few pieces of plastic card will add the necessary instrument panel, consoles, floor, and seat required to enhance the model. A fine wire that can be bent into the shape of a Y can be used to represent the control yoke. It is then a simple matter to cut the canopy away from the windscreen and display it in the open position so as to reveal the scratchbuilt cockpit.

Decals are provided for the California Air Guard's 196th Fighter Interceptor Squadron/163rd Fighter Group. The aircraft is 57-0776. This original issue, released in 1970, is now a collector's item worth between two and four dollars.

Entex F-102A, Kit Number 9011Z

This is a 1972 release by Entex of the Otaki kit covered immediately above. It is the same as the Otaki issue to include the decals and the two to four dollar price on collectors' tables.

Otaki F-102A, Kit Number OT2-23-150

Otaki re-released its earlier kit again in 1985. Except for the box art, it was identical to the original issue covered above.

Arii F-102A, Kit Number A235-200

This is the same as the Otaki kit OT2-23-100, to include the decals and even the box art. It was issued in 1987.

Revell F-102A, Kit Number 4047

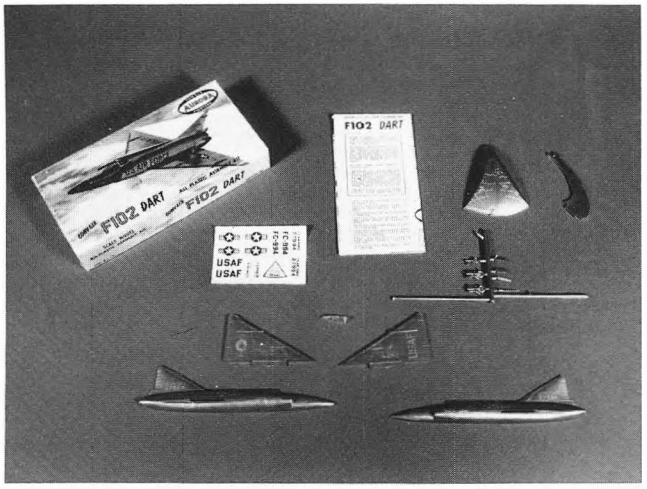
In 1988 Revell got into the act of re-releasing the Otaki kit. It is the same as OT2-23-150, and even has the same box art. If this kit is issued again, hopefully it will include some decals that are different from the same ones used in every release so far.

**1/121st Scale Kit**

Aurora F-102A, Kit Number 290-29

The -29 in the kit number indicates the price of the original release of this small model (twenty-nine cents!) when it was first issued in 1957. Today it brings between four and eight dollars from collectors.

A **YF-102** nose marking is provided, and the serial and buzz numbers on the decal sheet indicate the first YF-102, but the model was obviously based on the YF-102A. It has the longer fuselage, V canopy and windscreen, inner boundary layer fences, and crude representations of the aerodynamic bulges at the tail. All of these features are characteristic of the YF-102A. Although landing gear is provided, there are no wells, and the weapons bay is not even scribed in. The outline is at best only generally correct, and the locations for the markings are scribed into the plastic. There is no cockpit or any other detailing. If you follow the instruction sheet, you will assemble the main landing gear backwards! In short, this is a typical small Aurora model from the fifties, and, without a monumental amount of effort, it can only be built as a very basic desk stand model. To this end, a two-piece stand is provided. If a modeler simply must attempt to turn this into a




*One of the oldest kits is this offering from Aurora. The box, instructions, decals, and the entire kit is shown here.*

serious model, it would be best to shoot for one of the YF-102A prototypes.

### 1/78th Scale Kit

Revell F-102A, Kit Number H-233

Originally issued in 1956, this is one of the oldest F-102 kits available. It was a typical "fifties" Revell release, being of an odd "fit the box" scale, and having the famous Revell swivel stand. The model had twenty-two parts in silver plastic. The pilot figure was molded into the seat, and that was all the cockpit detailing that was provided. There were no wheel wells, just indentions into the plastic. The landing gear was very simple with no detailing.

The model represented an early production aircraft with the short tail, and the wing was the Case X version. There were no intake ramps and the small speed brake was represented. Scribing was raised, and there were a lot of rivets and locations for the markings scribed into the plastic. Markings were for F-102A, 53-1793, and there was a tail marking consisting of a red arrow in a blue circle. No unit was indicated. A large circular decal was provided for the stand.

The shape of this model is not bad, and a decent desk stand model could be built of an early Deuce. The fact that it is in an odd scale will mean that it will not really fit into any collection.

Revell F-102A, Kit Number H-124

This was a 1978 reissue of the kit covered above. The one change to the plastic was that this issue had only the upper torso of the pilot with the seat ending on a shelf instead of extending all the way down to the floor. Decals provided a serial number of 54-1396, and a buzz number of FC-396. The tail markings consisted of a black and silver checkerboard with a red winged head in a circle on the lower front indicating the 327th FIS. Fuselage stripes are also provided. This issue did not have the swivel stand.

Revell F-102A, Kit Number H-130

This issue is the same as the original, but without the swiveling stand. Even the decals are the same. It is molded in white plastic.

*The old Revell 1/78th scale model represents the Deuce with the early short tail (although the box art in this case shows the taller tail).*

### 1/72nd Scale Kits

Frog F-102A, Kit Number F286

Since there are no original dates of issue printed on the box or instructions, we are not really sure whether the Frog or Hasegawa issue of this kit came first. But either way, the Frog kit is history, and the kit is now considered to be a Hasegawa model. In any event, the model is essentially the same in every issue. Only the box art and decals change. Therefore, we will cover the kit in more detail below. As for the Frog release, decals were included for an F-102A, 56-0987, of the 32nd FIS, and another F-102A, 56-1076, with markings for the Turkish Air Force.

Hasegawa/AMT F-102A, Kit Number A-654

The first company to bring this Hasegawa kit into the United States was AMT, and it had decals for two aircraft. One was in the ADC gray scheme, and had markings for the 460th FIS. This included an emblem with a tiger's head and the words **CAVE TIGRUM** on a scroll. The serial number was 56-1470. The second was from the 62nd FIS, 51st FIW, and was painted in the SEA camouflage scheme. It had a serial of 57-0779 and a tail code of **NV.** The box art was interesting in that it had two aircraft flying along in formation, while a third F-102 attacked a convoy along a road. One can only wonder what weapons this air-to-air interceptor used to attack trucks on the ground!

Hasegawa/Minicraft F-102A, Kit Number JS-047

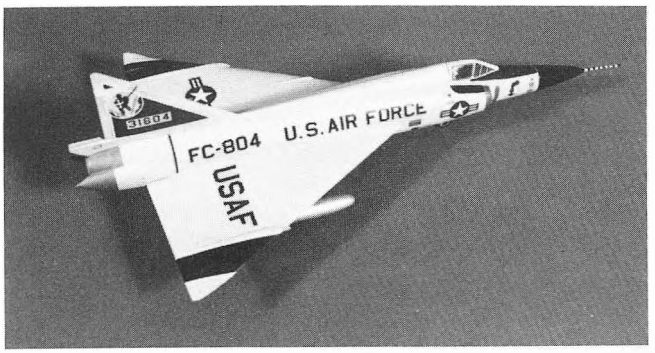
Minicraft took over the import responsibilities for the Hasegawa line after AMT, and released the same kit with a change of decals. In this release, the markings were for an aircraft from the 32nd FIS with the serial number 56-1032. Markings for a second F-102A were also provided. These were for 53-1804, from the 68th FIS, and are the ones shown in the photograph accompanying these reviews.

Hasegawa/Minicraft F-102A, Kit Number 1074

A second release of the Hasegawa kit was made by Minicraft with new Scale-Master decals. These were for an aircraft of the 196th FIS of the California Air National Guard, 55-3391. This unit carried distinctive markings on its external tanks, but they were not included on this decal sheet.

Hasegawa F-102A, Kit Number 713

This was the most recent release of this kit at press time for this book. We will make a complete review of it here, covering the features common to all of the kit's various releases first, then explaining the additions made to this particular release which features yet another decal sheet with the California Air Guard's 196th FIS/163rd FG. This time the fuel tank markings are provided on the




*The Hasegawa 1/72nd scale kit is the only one that is available in this popular modeling scale. However, it has been released numerous times. It is an old kit, but is accurate in shape and outline.*

sheet, and the aircraft is F-102A, 57-0856. The blue in the California markings is too dark, and the white is an off white rather than being a pure gloss white. For some reason, Hasegawa included decals for the wing fences which are red on this aircraft. It is easier, and it looks better, if the fences are simply masked off and painted. The box art shows an aircraft with a Case XX wing, but as is the case with all issues of this kit, the plastic represents a Case X wing.

The important thing about this kit is that it is pretty good when it comes to outline and shape. It has many early features of the Deuce to include the earlier wheel design. Wheels from the Hasegawa F-106 kit can be substituted if the later design is desired, and the ones in this kit can be used with the F-106 if an early "Six" is being modeled from that kit. The nose wheel is the solid spoked design. The landing gear is quite basic, and much detailing will be required. For example, there is no support between the main gear struts and the outer doors. The landing lights on the main doors are also missing, and the one on the nose gear door is only a light without the framework around it. The actuating cylinders/struts for the main gear are incorrect and need to be replaced with some made from scratch. There are no actuating rods for the inner main gear doors. Detailing will be required in all three wells. The modeler should be aware of whether he is building a "straight gear" Deuce, or one with the main gear angled forward. Knowing this, he can position his main gear accordingly.

There is a fairly complete weapons bay provided with extended launch rails for six rather generic looking Falcon missiles. It is hard to tell just what version they are, but it would appear that they are either AIM-4Fs or -Gs. They do not have the separation between the wings and the elevons, and are better replaced by ones from Hasegawa's weapons set Number 3 in 1/72nd scale. These Falcons do have the separation between the wing and the elevon, but do not have the hinge between the two. So even with these better missiles, the modeler has to add a lot of pieces from scratch. Eight small hinges, best made from stretched sprue, have to be added to each missile. Eight hinges for six missiles means making and adding forty-eight tiny hinges! The doors for the bay are too thin, so the tubes for the 2.75-inch rockets are not represented, and they cannot be added by the modeler. The only solution is to make thicker doors from plastic card and drill out the rocket tubes. There really isn't any detailing on the doors or in the bay, so a modeler can really do a lot of work in this area. We took the simple way out and built the model with the doors closed. But this is not as easy as it seems. The doors do not fit well in the closed position, so a lot of filling and sanding is required.

The cockpit is very sparse with only a seat and crude pilot to fit on a single piece that represents the floor, consoles, and nose gear well. There is no instrument panel (except on the latest release) and no control yoke in any release. Here again the modeler is in for a lot of work. He will then face another problem once this is finished and he wants to display the detailing he has added to the cockpit. The canopy and windscreen are molded as one piece which can easily be cut apart. But the clear part is only that portion of the canopy that has the glass. The canopy rails and the solid part of the canopy between the glass and the hinges are molded as part of the fuselage. This must be cut away from the fuselage, then glued to the clear part. Hinges must be added, then the canopy can be mounted in the open position. It is actually a lot harder than it sounds to do the job well.

At the other end of the model, the engine and afterburner are represented by a tube that inserts into the aft end of the fuselage. It is acceptable, but it would have been better if some representation of the noticeable afterburner nozzle had been included. The kit has had the tail hook since the beginning, but there are no data link antennas in any issue. The barrier probe is too thin, and should be replaced with one made from scratch. Until the latest issue, there was no IR sensor on the nose, but this was easily added from the end of a spare Sidewinder missile.

One of the things a modeler must be aware of when building any kit of the F-102 is which wing was on the particular aircraft he is modeling. As we have stated in this book, the cambered Case XX wing replaced the earlier Case X wing beginning with aircraft 56-1317. That aircraft, and all of those that followed, had the Case XX wing. This particular kit has the Case X wing. Although we have not tried it yet, it would seem to be a simple task to convert this model to a Case XX wing by using part of the wing from the Hasegawa F-106 kit. Cut the wing tips off of the F-102 kit about 1/16th of an inch outside of the outer wing fence. Cut a matching piece from the F-106 kit and glue it in place. You will have to work on the camber a bit, and re-scribe the outer edge of the elevons to the proper angle as shown in the photographs and drawings in this book, but the results should be a fairly decent representation of the Case XX wing that will satisfy most modelers.

In the latest release, Hasegawa has added two small braces between each intake ramp and the fuselage, an IR

sensor on the nose, and a radar hood, gunsight, and instrument panel in the cockpit. The UHF and upper IFF antennas have been added to the spine as has the upper beacon. The lower beacon and data link antennas are still missing.

With some work making a few corrections, some additions, and a lot of detailing, an excellent model can be built from any release of this kit. But it is simply not up to today's standards, and modelers need a state-of-the-art kit to work with in 1/72nd scale.

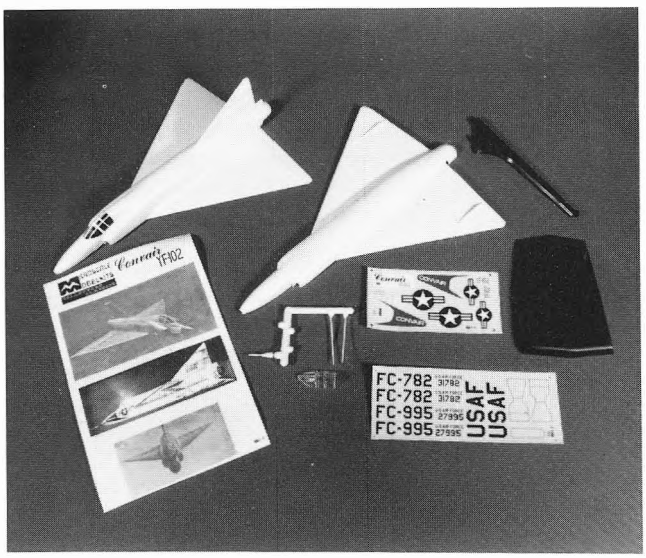
**1/60th Scale Kits**

Allyn YF-102, Kit Number 911

Released in 1953, this kit is as old as the prototypes themselves. It was a very basic kit with only five white pieces and one clear part for the canopy. A two-piece black stand was also provided. It had no detailing and no scribing. It is not for modelers, but it is a real collector's item, and it brings between sixty and eighty dollars.

Microscale YF-102, Kit Number MS4-4

This is a reissue of the Allyn kit above. Decals were included that provided serial numbers 53-1782, which was not a YF-102, and 52-7995, which was the second YF-102. Since there was no scribing on the kit, the decal sheet also provided the outline of the gear doors! Nose markings for the prototype and national insignia are on a second decal sheet. The kit brings between fifteen and twenty dollars from collectors.




*Microscale issued this old model of the YF-102 prototype. It was a 1/60th scale desk stand model with no landing gear, and it had no scribing, not even for the control surfaces.*

**1/48th Scale Kits**

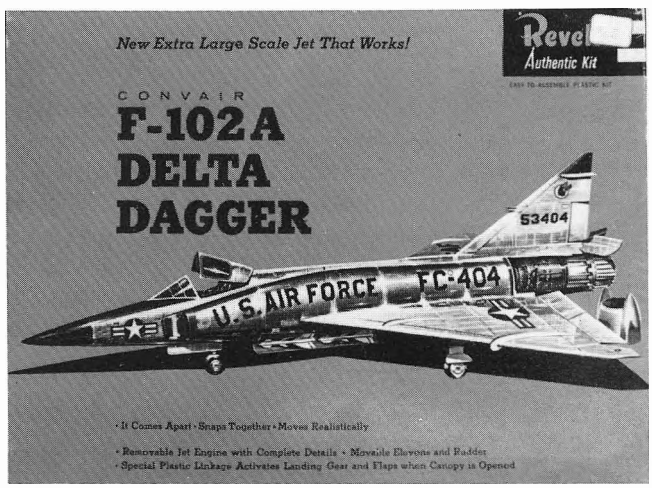
Revell F-102A, Kit Number H-282

Although this kit is 1/49th scale, it is close enough to be included here and in any 1/48th scale collection if one is foolish enough to build it. The reason that the kit should not be built is because it brings $150.00 and up from collectors! With the new Monogram kit coming in 1/48th scale, there is no need to build this one which is more of a toy anyway.

This original issue came with ground support equipment, and the modeler of the late 1950s and early 1960s could build a diorama. Although the shape of the kit was basically correct, it featured many moving parts that made it quite inaccurate in even the most fundamental detail departments. For example, there was only two weapons bays, as opposed to the correct three, and each of these had only one door. Falcon missiles were attached to these doors rather than to rails. Close the canopy, and a linkage retracted the landing gear. The RAT opened and closed as well. The elevons moved up and down and the rudder moved left and right. The tail hook could be lowered, and the speed brakes opened. The aft section of the fuselage could be removed to show the engine. Because of the linkage connected to the canopy to move the landing gear, there was no cockpit interior at all, and there were pins and slots on every moving piece that detracted greatly from the accuracy of the model. In short, this was not a scale model, but an elaborate toy. Its value is to collectors only, not to modelers. Decals were provided for the 327th FIS, and the aircraft had a serial number of 55-3404.

Revell F-102A, Kit Number H-281

This kit is the same as H-282 above except that it does not have the ground support equipment. It brings $150.00 and up from collectors.


New Extra Large Scale Jet That Works!
Authentic Kit
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FC-404
• It Comes Apart • Snaps Together • Moves Realistically
• Removable Jet Engine with Complete Details • Movable Elevons and Rudder
• Special Plastic Linkage Activates Landing Gear and Flaps when Canopy is Opened

*The old Revell kit in 1/49th scale has a lot of working features. It originally cost $1.95, but now goes for over $150.00 on collector's tables.*

Monogram F-102A, Forthcoming Kit

At the 1989 RCTA show in Chicago, Monogram announced a 1990 release of a 1/48th scale F-102. At press time for this book, not even a test shot was available to us, but the designers at Monogram, to whom we have

sent photographs and other information, as well as suggesting other sources of information, have told us about their plans for this kit. At present, Monogram intends to issue the kit with the Case XX wing and a complete weapons bay. Doors for the weapons bay will be issued in two sets, one in the closed position with all doors molded together, and another set molded separately to allow the weapons bay to be built in the open position. Missile rails can be assembled extended or retracted. The cockpit, landing gear, and wheel wells will all be detailed. Most F-102 add-ons such as the IR sensor, tail hook, data link antennas, etc., will be included. The canopy can be shown open or closed. With Monogram's excellent reputation in producing quality 1/48th scale kits, this one is awaited with great anticipation and excitement. It should be released within six or seven months after this book, so study the details carefully and be ready to turn this new Deuce into a showpiece model!

### 1/32nd Scale Kit

Combat Models F-102A, No Kit Number

Although we obtained one of these kits as a review sample, we have not had the chance to build it. We have seen one at an IPMS contest, and the finished product looked pretty good. As with any vacuformed kit, what you get out of it is largely what you put into it, and the detailing possible with this kit could take years to complete. Even the basic model will require a lot of scratchbuilding on the part of the modeler in areas like the wheel wells and the cockpit.

The vacuformed parts of the kit come on two large pieces. A smaller flat piece of plastic is provided to make additional parts. Those already vacuformed and contained in the kit include the fuselage halves, four wing pieces (top, bottom, left, and right), left and right halves of the vertical tail, fuel tank halves, speed brake halves, intakes, intake ramps, nose wheel, main wheels, cones to go at the ends of the aerodynamic bulges, and a single-piece clear canopy/windscreen combination. Struts for the landing gear are provided as metal pieces. Everything else is left for the modeler to build from scratch. As a minimum, the modeler will have to add a cockpit interior, landing gear doors, pylons for the fuel tanks, wing fences, elevon hinge fairings, and a pitot probe to start with. But there are many areas where hours and hours of fun can be had adding details. The cockpit alone offers considerable possibilities, and think what could be done if the weapons bay was opened up. Everything, to include the missiles, would have to be built from scratch! The speed brake could be opened and detailed, and the engine could be added. Wheel wells could be detailed considerably, and imagine what kind of work it would take to add the MG-10 fire control system and the radar. Just open up the panels, remove the radome, and go for it! A truly awesome model could be built.

The shape and outline of this kit looks pretty good except for one area. It is difficult to tell if the wing is the Case X or Case XX variety. It has the elevons that were used on the Case X wing, but the tips are not correct for either version. So it will be necessary for the modeler to do some reworking here. It would probably be just as easy to do one wing as the other.

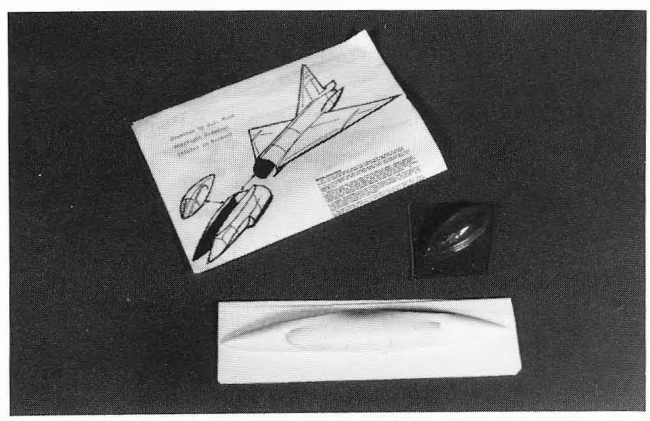
There are two instruction sheets with large drawings of the F-102 and very generic instructions on how to build a vacuformed kit. There are no instructions for this kit in particular. A third smaller sheet shows some F-102 markings and details, and was taken from an issue of "Replica in Scale" magazine. There is also a generic decal sheet, but unfortunately most of the markings are not any good for anything bigger than 1/48th scale. The national insignia could be used on this kit, but that is about all.

This is a decent 1/32nd scale vacuformed kit, but if you decide to give it a try, be ready to put in a lot of hours and do a lot of scratchbuilding as you would with any vacuformed kit this size.

### Conversion Parts

Airmodel TF-102A Conversion, Kit Number 131

This conversion kit, which is no longer generally available, provided two nose pieces vacuformed on a piece of white plastic. A clear canopy was also provided. It was intended to be used with the Hasegawa 1/72nd scale model. The kit is very basic, and does not include any cockpit parts, the plates for the intakes, and other small details. The fact that these parts are needed is not even included on the instructions, nor is any attempt made to explain how to build them. Perhaps the most difficult part about using this kit would be to add all of those tiny vortex generators to the canopy. That would be both time-consuming and nerve-racking! A good modeler, following the photographs and drawings in this book could do this conversion and come out with a nice finished product. But it would take a lot of time to do correctly, and the entire cockpit would have to be built from scratch. Other than doing it completely from scratch, this is the only way to build a TF-102A at present.



*Airmodel issued this conversion kit in 1/72nd scale to be used with the Hasegawa model. It provided two vacuformed white nose pieces and the wider two-place clear canopy so the modeler could build a TF-102A.*

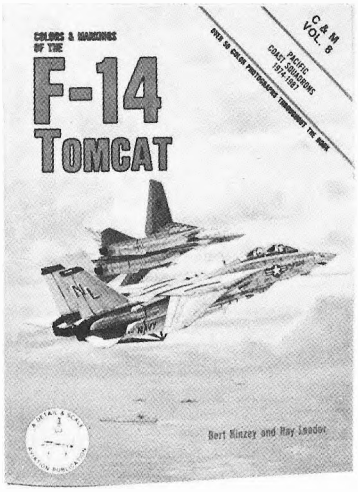
# DECAL LISTING

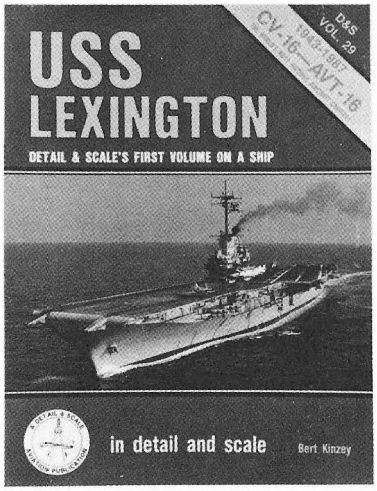
| Manufacturer and Sheet Number | Scale | Type | Serial No. | Unit | Scheme | Comments |
|---|---|---|---|---|---|---|
| Superscale 14-107 | 1/144 | F-102A | 55-3391 | California ANG | ADC Gray | See note 1 below. No fuel tank markings |
| | | F-102A | 56-1278 | Wisconsin ANG | ADC Gray | |
| | | F-102A | 56-1274 | 317th FIS | ADC Gray | |
| Superscale 14-108 | 1/144 | F-102A | 53-1802 | 10th FIS | ADC Gray | See note 1 below. |
| | | F-102A | 56-1467 | 64th FIS | ADC Gray | |
| | | F-102A | 56-1447 | 57th FIS | ADC Gray | William Tell 1972 markings |
| Superscale 14-265 | 1/144 | F-102A | 56-1131 | 496th FIS | ADC Gray | See note 1 below. |
| | | F-102A | 55-3460 | 431st FIS | ADC Gray | |
| Superscale 14-266 | 1/144 | F-102A | 55-3372 | 327th FIS | ADC Gray | See note 1 below. |
| | | F-102A | 56-0960 | 4th FIS | ADC Gray | Named "Red-Striped Rascal." |
| Aerodecal 21A | 1/72 | F-102A | 56-1264 | 535th FIS | ADC Gray | |
| | | F-102A | 57-0869 | Vermont ANG | ADC Gray | William Tell 1972 markings |
| Modeldecal II | 1/72 | F-102A | 56-1487 | 460th FIS | ADC Gray | |
| Modelmark 5 | 1/72 | F-102A | 57-0823 | Washington ANG | ADC Gray | Col. Charles L. Nelson Jr. is pilot's name |
| Superscale 72-107 | 1/72 | Provides markings for the same three aircraft as sheet 14-107 shown above. | | | | |
| Superscale 72-108 | 1/72 | Provides markings for the same three aircraft as sheet 14-108 shown above. | | | | |
| Superscale 72-265 | 1/72 | Provides markings for the same two aircraft as sheet 14-265 shown above. | | | | |
| Superscale 72-266 | 1/72 | Provides markings for the same two aircraft as sheet 14-266 shown above. | | | | |
| Superscale 72-363 | 1/72 | F-102A | 56-0977 | 32nd FIS | Bare Metal | |
| Superscale 72-407 | 1/72 | F-102A | 56-1340 | Pennsylvania ANG | ADC Gray | |
| Unknown | 1/72 | F-102A | 56-1489 | Connecticut ANG | ADC Gray | See note 2 below. |

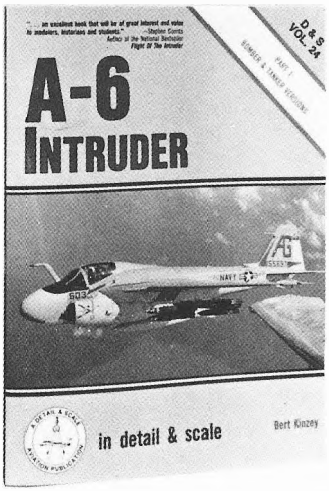
Note 1: Superscale's 1/144th scale sheets are simply their 1/72nd sheets reduced to one-half size. They made no attempt to size the decals to the tail surfaces, rudder, and other surfaces of the 1/144th scale model. Therefore, fit is very bad in most cases.

Note 2: This decal sheet was issued many years ago and is no longer generally available. We had only a portion of the instruction sheet and decals to go by, and neither provided the manufacturer or sheet number. This is a good sheet if it can be found, and is the only one produced so far that provides the unusual Connecticut ANG markings.

Note 3: All decals listed under the Superscale name were formerly available under the Microscale label, and in many cases still are.

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